The FOUNDRY

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Cleveland

STARTING Monday, May 14, visitors to the American Foundrymen's association convention and exhibition in Philadelphia, will be greeted each morning by the Philadelphia Daily Edition of THE FOUNDRY. This complete newspaper, filled with spot news of the great gathering of foundrymen, also will be mailed with the compliments of the association to homes of all of its members.

Perhaps a brief account of the method of handling this paper will be of interest, as it represents an unusual undertaking in remote control publishing. A staff of men from the Cleveland and New York offices of the Penton Publishing company will be on the ground starting Thursday, May 10. These men will cover every activity of the convention, each technical session, the business meetings, the myriad events of the great exhibition and the entertainment features.

The news will be transmitted to Cleveland by the use of every modern means of rapid communication. These will include special delivery mail, air mail, the telegraph, telephone and telephoto. In Cleveland a staff of editors artists and makeup men trained in daily newspaper work and attuned to the speed of handling news will compile and assemble each day's paper. The facilities of the Penton Press Co. for the four main days of the convention will be dedicated to this undertaking.

Each day's edition will be delivered to the exhibit and the meetings.

Philadelphia

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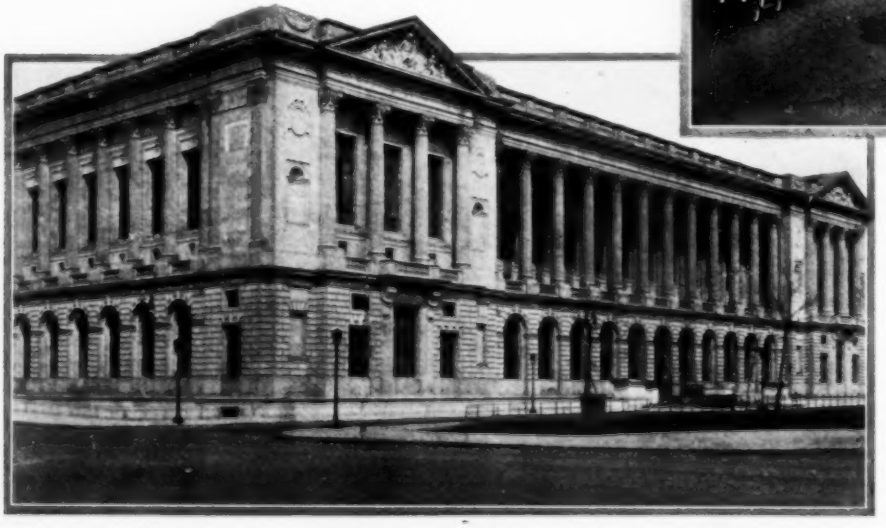
Philadelphia
Fourth A. F. A.

PHILADELPHIA, one of the largest, oldest, most important and probably richest in historical and patriotic tradition of all American cities will act as host to the American Foundrymen's association for the fourth time during the week May 14-18, this year. Here the association was launched in 1896, an adventurous bark, manned by a hardy crew buoyed up by high hopes and aspirations to place the foundry industry on the plane to which it is entitled as one of the greatest in the basic group engaged in the fabrication of metals. Per capita consumption of iron and steel long has been regarded the surest indication of a nation's wealth and prosperity. On a per capita basis the annual consumption of iron and steel was approximately 500 pounds when the association was formed and that amount has been almost doubled since that time.

If the formation of an association for improving the foundry industry was of paramount importance in the early days, how much more necessary is its continuance in these fiercely competitive modern days when more than ever before the race goes to the swift and the battle to the strong and when co-operation means salvation.

That foundrymen are conscious of this fact is shown in the steady growth of the association since its inception. Every state in the Union and almost every Canadian province is represented on its roll of members. The scope of its work and activities has been extended year by year to include every feature connected with its recognized



Broad Street, one of the Longest and Widest Streets in the World, Bisects Philadelphia from North to South. The View Shown Above Was Taken in the Neighborhood of Spruce Street Looking North toward the City Hall. Philadelphia Has an Extensive Library System Centering in the New Main Library Building Shown at the Left

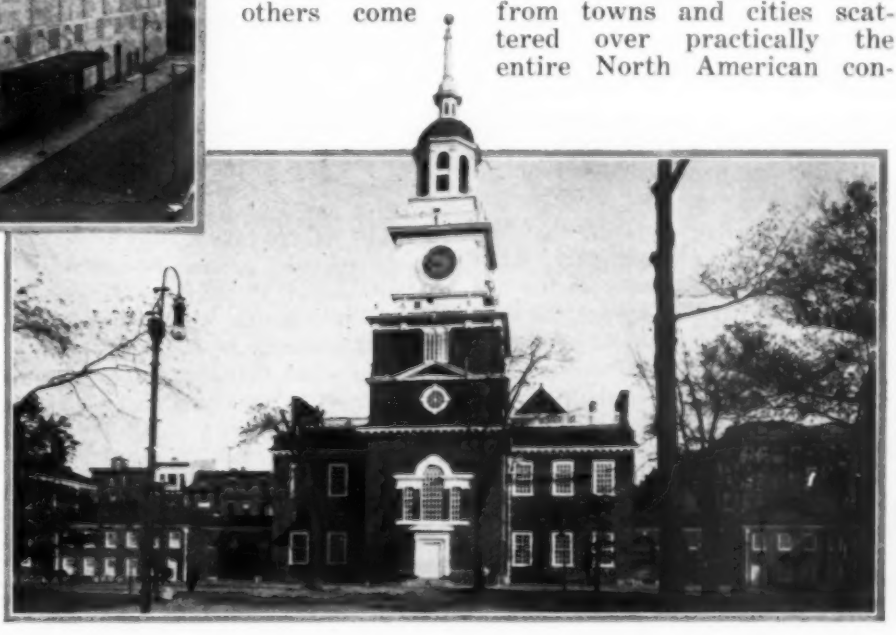
To Welcome A. Convention

and legitimate field, practical and technical features involved in the production of castings.

Attendance at the annual conventions and exhibitions has shown a steady upward trend since the beginning. Advance reservations for hotel accommodation and exhibition space this year indicate that the present event will constitute a record in this respect.

The lure of the city itself with its rank and prestige as a great commercial and manufacturing center is a powerful magnet. Situated on the lordly Delaware, it is the second largest seaport in North America. As the birthplace and cradle of American national independence it is a patriotic shrine of historical interest. League Island navy yard and the magnificent new suspension bridge with the longest span in existence, represent the highest achievement in modern engineering practice. Whether the visitor is actuated by business, pleasure, sentiment, curiosity, singly or in combination, Philadelphia is equipped in a singularly complete manner to meet all demands.

Of all those who attend the present convention probably those who are left from the original party which met in Philadelphia to organize the association in 1896 will be most deeply impressed. They will experience the gratification of all men who live to see their plans carried to a successful conclusion. Several of these men always have made their homes in Philadelphia while others come from towns and cities scattered over practically the entire North American con-



The Main Entertainment Program Arranged by the Committee of Philadelphia District Foundrymen and Equipment Manufacturers Will Be Held in the New Scottish Rite Temple, Shown Above. Independence Hall, the Birthplace of American Liberty, Is Visited Annually by Thousands. The Front Entrance Is Shown at the Right

tinent. At the first session held in the Manufacturer's club each of the delegates was given a numbered badge for record and identification. The meeting was called to order with Francis Schumann in the chair and with Howard Evans acting as secretary. Later Mr. Schumann was elected president. Mr. Evans was elected treasurer and John A. Penton, responsible in large part for starting the movement toward organizing the association, was elected secretary. Subsequently Mr. Schumann was re-elected for the two following terms, 1897-98. Mr. Evans was treasurer for four years, 1896-1900 and Mr. Penton served as secretary for three years 1896-99. Of the three only the two latter remain, the first as perpetual secretary of the Philadelphia Foundrymen's association and the second as chairman of the board of the Penton Publishing Co., Cleveland, publisher of THE FOUNDRY.

The late Francis Schumann as a captain of engineers served under General Meade in the Army of the Potomac and afterward became president of the Tacony Iron & Metal Co., Philadelphia. The heroic statue of William Penn surmounting the city hall in Philadelphia was fabricated at the plant of that company. A general idea of the size of the figure gazing north from a height of over 500 feet may be had from the statement that the total weight is 27 tons, total height 37 feet and width across the shoulders 11 feet. The nose is 13 inches in length and each of the buttons on the Quaker coat is 6 inches in diameter.

At this first meeting F. A. Riehle, Riehle Bros., Testing Machine Co., presented a resolution to appoint a committee to draw up a suitable constitution and set of by-laws for the association. The resulting committee was made up of A. Sorge Jr., Chicago, R. Taylor, Pittsburgh; Frank A. Magee, Boston; J. Best, Montreal and C. S. Bell, Hillsboro, O. Mr. Riehle, although no longer active in business, still maintains a keen interest in engineering progress.

It is interesting to note that the association has had only four secretaries and five treasurers during the 32 years of its existence. Richard Moldenke followed John A. Penton as secretary in 1900 and filled the office continuously until 1914 when he was succeeded by the late A. O. Backert who held the office from 1914 to 1918. In the latter year C. E. Hoyt was elected secretary and has been re-elected each year since that time.

Among the treasurers the late Thomas D. West held the office for one year 1901. He was followed by Willis Brown, also deceased, who handled the funds in 1902. Dr. Moldenke combined the office of secretary and treasurer from 1903 to 1914 when the same combination was taken over by the late A. O. Backert until he was elected to the presidency of the association in 1918. Since that time the same combination of office has been maintained and administered by C. E. Hoyt.

In 1896 during the presidency of Francis Schumann the policy of dividing the country into districts and appointing a vice president for each district was adopted. The first list included C. J. Caley, John W. Burr, Stanley J. Flagg Jr., J. H. Whiting, W. J. Keep, J. P. Golden, L. L. Anthes and T. W. Sheriffs. This policy was continued until the association was incorporated in 1916 when the present practice of electing one president and one vice president each year was resumed.

Papers Cover Wide Field

ON TUESDAY morning the formal opening of the 1928 convention will begin with the business session presided over by President S. W. Utley. A view of the extensive interests and importance of the activities of the association may be obtained at this session from the short summaries presented by each committee chairman.

Technical sessions scheduled for the mornings of the convention week relate to the particular interests of the various branches of the industry, namely, malleable, steel, nonferrous and cast iron, and will take place at the Bellevue-Stratford hotel. Afternoon sessions which will be of general interest, will be held at the Commercial museum where the exhibits will be housed.

Sixteen sessions have been planned and everyone connected with the industry will find something of vital importance on each day of the convention. For executives and those interested in management, sessions on cost practice, management, materials handling and apprentice training will be held. At the cost session a discussion of the cost system developed for steel foundries by the Steel Founders' Society of America will be presented. While this system is designed particularly for steel foundries, it also may be applied to all foundries. Metallurgical advancements in all branches of the industry will be described in papers presented at the various sessions on steel, malleable iron, gray iron and nonferrous metals, and at the sessions on sand control.

Shop men particularly will be interested in the informal round table meetings at which discussions of practical problems will take place. Discussions of shop problems in the malleable and nonferrous industries will be preceded by luncheon gatherings. For gray iron foundrymen a four-period course on cupola practice has been arranged. Steel shop men will find several discussions in the regular steel sessions of interest, and all practical men further will be interested in the discussions and papers on materials handling, apprentice training and sand control.

The first steel session will be devoted to papers on oxy-acetylene cutting of risers, reduction of new sand consumption, interdependence of operating and sales departments, and the Institute of British Foundrymen's exchange paper on variables in steel foundry practice. The second steel meeting will be along metallurgical lines with a description of the new research laboratory of the American Steel Foundries, and the new heat treating department of the Bucyrus-Erie Co. Other papers will discuss manganese and other alloy steel castings. Particular interest at this session will center around reports of the committee on steel casting and the work on investigation of the effects of phosphorus in steel.

Malleable foundrymen will have two special sessions; one of which will be a round table discussion on practical shop problems and the other will be devoted to discussions of management and metallurgy. Another program of interest will be the one on sand control which will go into the subject of rebonding molding sands.

Gray iron foundrymen will have a wealth of material for their consideration. A four-period course on cupola operation led by such men as Dr. Moldenke, David McLain, E. J. Lowry and H. W. Dietert should give good practical knowledge on the best operation of the cupola. In addition, a regular technical session will be held at which recent cupola developments will be described. Papers on temperature measurements of molten cast iron, the use of chill test bars and shop practice in producing high-strength cast iron will be presented at another session, while a third session will be especially noteworthy because it pertains to the recent demands for high-strength irons and the need for determining the properties of iron castings from test bars.

At the latter meeting J. W. Bolton will describe his findings on the correlation of carbon and silicon variations with cooling rates in determining

(*Continued on page* 329)

Tentative Program of Technical Papers

Monday, May 14

1:00 to 5:00 p. m.—*Registration*
Committee meetings

4:00 p. m.—*Cupola Operation Course*
Leader—DR. RICHARD MOLDENKE
Principles underlying cupola melting process.

Tuesday, May 15

9:30 a. m.—*General Opening Meeting and Business Session*
Chairman—S. W. UTLEY

11:00 a. m.—*Nonferrous Metals*

Science in the Foundry, by E. F. Hess, Ohio Injector Co., Wadsworth, O.
Furnace Refractories for Brass Foundries, by H. M. St. John, Detroit Lubricator Co., Detroit.
Risers, Their Need and Methods of Feeding, by R. R. Clarke, General Electric Co., Erie, Pa.
The Effect of Melting and Pouring Conditions upon the Quality of No. 12 Aluminum Alloy, by T. W. Bossert, Aluminum Co. of America, New Kensington, Pa.

11:00 a. m.—*Steel Founding*
Chairman—W. J. NUGENT

Economies in Oxy-acetylene Cutting for Riser Removing, by G. O. Carter, Linde Air Products Co., New York.
Variables in Steel Foundry Practice, by F. A. Melmoth, Thos. Firth & Sons Ltd., Sheffield, England. British exchange paper.
Interdependence of Operating and Sales Departments in the Success of a Foundry, by K. V. Wheeler, Lebanon Steel Foundry, Lebanon, Pa.
Reducing New Sand Consumption in a Steel Foundry, by H. A. Mason, Gould Coupler Co., Depew, N. Y.

11:00 a. m.—*Cast Iron Founding—Cupola Developments*
Chairman—R. F. HARRINGTON

Theory of Cupola Operation in Relation to Practice, by R. B. Schaal, Roberts & Mander Stove Co., Hatboro, Pa.
Automatic Blast Gate Control for Cupola Melting, by H. V. Crawford, General Electric Co., Schenectady, N. Y.
Refractories for the Cupola, by C. E. Bales, Ironton Fire Brick Co., Ironton, O.

2:00 p. m.—*Foundry Costs*
Chairman—A. E. HAGEBOECK

Report of the committee on foundry costs.
The Schedule Fallacy, by J. J. Ewens, George H. Smith Steel Casting Co., Milwaukee.
Necessity for Creating a Castings' Consciousness, by A. F. Jensen Hanna Engineering Co., Chicago. Presented on behalf of the Foundry Equipment Manufacturers' association.

4:00 p. m.—*Cupola Operation Course*
Leader—E. J. LOWRY
Cupola construction details.

Wednesday, May 16

10:00 a. m.—*Steel Metallurgy*
Chairman—JOHN HOWE HALL

General Characteristics of Alloy Steel Castings, by J. W. Frank, Chicago Steel Foundry Co., Chicago.
Manganese Steel, by H. P. Evans and A. F. Burtt, Pettibone-Mulliken Co., Chicago.
A Modern Plant for the Heat Treatment of Miscellaneous Steel Castings, by A. W. Lorenz, Bucyrus-Erie Co., Milwaukee.
Research Laboratory of the American Steel Foundries, by W. C. Hamilton, American Steel Foundries, Indiana Harbor, Ind.
Report of the committee on steel castings.
Report of the committee on heat treatment of ferrous castings.
Report of the A. F. A. representative on the joint committee on investigation of the effects of phosphorus and sulphur in steel.

10:00 a. m.—*Cast Iron*
Chairman—J. W. BOLTON

Influences of Carbon and Silicon Variations in Cast Iron, by D. G. Anderson and G. R. Bessmer, Western Electric Co., Chicago.
Some Recent Developments in Cupola Metal, by J. D. Miller, Cresson-Morris Co., Philadelphia.
Temperature Measurements of Molten Cast Iron, by H. T. Wensel and W. F. Roeser, bureau of standards, Washington.
Test Bar for Testing the Chill of Cast Iron with Medium and High Silicon Contents, by Marcel Dudouet, Ecole Superieure de Fonderie, Paris, France. French exchange paper.
Heat Losses from a 75-ton Hot Metal Car, by W. F. Roeser, bureau of standards, Washington.

10:00 a. m.—*Malleable Iron*
Chairman—F. M. ROBBINS

Reducing Scrap in the Malleable Foundry, by R. A. Greene, Ohio Brass Co., Mansfield, O.
Effects of Various Elements on Malleable Cast Iron, by L. E. Gilmore, Crane Co., Chicago.
The Need for Research in the Foundry, by E. E. Griest, Chicago Railway Equipment Co., Chicago.
Oxidation Phenomena during the Annealing of Malleable Cast Iron, by H. A. Schwartz, National Malleable & Steel Casting Co., Cleveland.
An Incentive Bonus Plan for Molders Based on Scrap Control, by R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich.

12:30 p. m.—*Round Table Discussion on Brass Founding*
Chairman—N. K. B. PATCH

2:30 p. m.—*Foundry Management*
Chairman—H. COLE ESTEP

Basic Principles of Management in the Foundry, by J. D. Towne, Dayton, O.
Stabilizing Labor and Cutting Costs, by A. D. Lynch, Ohio Brass Co., Mansfield, O.
What Does the Buyer Expect for His Money? by J. A. Marks, Packard Motor Car Co., Detroit.
A Contribution to the Training of Labor and the Personnel of a Foundry, by Arthur Soupart, Musee Professional de L'Etat et des Ecoles Techniques de Morlanwetz. Belgian exchange paper.

2:30 p. m.—*Foundry Coke*
Chairman—A. J. TUSCANY

Round table discussion of the present status of coke specifications.
Presentation of Review of Status of Coke Specifications, by W. A. Selvig, bureau of mines, Pittsburgh.

4:00 p. m.—*Cupola Operation Course*
Leader—DAVID MCLAIN
Cupola charging practice.

Thursday, May 17

10:00 a. m.—*Apprentice Training*
Chairman—H. A. FROMMELT

The American Boy in the Foundry, by F. J. McGrail, Sheffield works, Fairbanks, Morse Co., Three Rivers, Mich.
Reports of Apprentice Training in Various Foundry Centers, by F. A. Lorenz, American Steel Foundries, Indiana Harbor, Ind., and L. U. Park, Park & Williams Inc., Philadelphia.
Discussion of apprentice training.

10:00 a. m.—*Cast Iron*
Chairman—H. W. GILLETT

Theory or Practice in the Gray Iron Foundry, by John Shaw, Southsea, England.
On Research Problems of the Gray Iron Foundry, by J. W. Bolton, Lunkenheimer Co., Cincinnati.
Report of the committee on gray iron.

12:30 p. m.—*Malleable Iron Round Table Discussion*
Chairman—F. L. WOLF
Following the luncheon gathering, an informal discussion of shop problems of the malleable foundry will take place.

2:30 p. m.—*Sand Control*
Chairman—B. D. FULLER

Surface Conditions of Castings as Affected by Core Sand Mixtures, by H. L. Campbell, University of Michigan, Ann Arbor, Mich.
Testing Molding Sands for Durability, by M. A. Blakey, International Harvester Co., Milwaukee.
Sand Conservation and Control in a Gray Iron Jobbing Shop, by T. F. Kiley, Brown & Sharpe, Providence, R. I.
Sand Control in a Light Casting Shop, by W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J.
A Compression Test of High Precision—The Colloid Nature of Natural Bond—The Effect of Heating on the Bond, by G. G. Brown, University of Michigan, Ann Arbor, Mich., and C. C. DeWitt, Michigan College of Mines and Technology, Houghton, Mich.
Report of committees.

4:00 p. m.—*Cupola Operation Course*
Leader—H. W. DIETERT
Cupola improvements.

Friday, May 18

10:00 a. m.—*Materials Handling*
Chairman—L. L. ANTHES

Materials Handling and Its Relationship to Building Plans, by E. F. Scott, Austin Co., Cleveland.
Determining Returns from Materials Handling Equipment, by J. J. Hartley, Link-Belt Co., Chicago.
What Materials Handling Equipment Can Do for the Jobbing Foundry, by W. B. Marshall, Chain Belt Co., Milwaukee.
Unloading Foundry Materials, by R. T. Turner, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
How to Determine when Materials Handling Equipment Should Be Installed, by H. J. Dorus and C. S. Schroeder, Yale & Towne Mfg. Co., Stamford, Conn.

Convention City Has Many Foundries

Location, Personnel and Capacity of Casting Plants in Philadelphia

Name and Address	Established	Metal Melted	Class of Castings	Daily Output in Tons	President or General Mgr.	Foundry Supt.
Abram Cox Co. American & Dauphin	1847	Gray Iron	Furnaces Stoves		Abram C. Mott, Jr.	Edward C. Nigg
Acme Brass Foundry 4317 No. American	1920	Nonferrous	Jobbing	3		A. H. Wineland
Wm. Adams Foundry Co., Inc. 960 No. Ninth		Gray Iron	Jobbing			E. F. Daley
Adelphia Mfg. & Plating Co. Belgrade & Orthodox	1923	Nonferrous	Jobbing	1	H. M. Lurker	H. Kreener
Aetna Foundry Co., Inc. 20th St. above Hunting Park	1916	Gray Iron Semi Steel	Machinery	15	R. T. Thum	A. G. Warren
American Bridge Co. Pencoyd, Philadelphia, Pa.	1898	Basic Open Hearth Steel	Mill Machinery	10	H. L. Hames	Wm. P. Cunningham
American Engineering Co. Aramingo & Cumberland (Two Foundries)	1857	Gray Iron Semi Steel Nickel Alloys	Stokers Hoists Marine Machinery	40	Maxwell Alpern	George H. James
American Manganese Bronze Co. Holmesburg, Philadelphia, Pa.	1908	Bronze	Propellers, Water Wheels, Rolls	25	T. H. Addie	Julius Klein
James Barker, Inc. Six & Cayuga	1887	Gray Iron	Jobbing	25	Alfred Barker	A. Talbot
H. Belfield Co. 435 No. Broad	1836	Bronze	Valves and Fittings	3	F. R. Goehring	Wm. J. Dower
George Bircher Estate 714-16 Cherry	1860	Nonferrous	Jobbing	½		George Bircher, Jr.
Bridesburg Fdy. & Engine Co., Inc. Tacony & Duncan	1913	Brass	Jobbing, Machinery		Harry Durgin	W. Hoffman
J. G. Brill Co. 62nd & Woodland		Brass	Light Street Car	¼	R. P. Liddell	O. C. Kahler
Brinton Foundry Co. Paul & Van Dyke	1923	Gray Iron	Jobbing	8	Harry S. Horrocks	Jesse W. Herner
E. E. Brown & Co. McKean & Meadow	1880	Tin Scrap	Sash Weights	45	T. Harold Brown	Herbert Wertheim
W. F. Buckley 627 Filbert		Gray Iron Bronze	Jobbing	1	W. F. Buckley	
Budd Grate Co. 2011-25 E. Hagert	1908	Gray Iron Nonferrous	Jobbing Grates, Stokes	15	L. Budd	W. H. Murphy
Bureau Bros. 23rd & Westmoreland	1859	Nonferrous	Ornamental, Machinery		Edmond W. Bureau	
Caskey & Keen, Inc. S. W. Sixth & Berks	1887	Gray Iron	Stove Pate Machine Jobbing	8	Wm. J. Steen	J. E. Stutz
Caskeys Brass & Bronze Works York & Richmond	1873	Nonferrous	Jobbing	1½	Wesley M. Caskey	G. W. Wightman
Central Stove Repair & Fdy. Co., Inc. 2318 Washington Ave.	1904	Gray Iron	Stove Repair	3	Thos. McCaffrey	W. C. Smith
Chambers Bros. Co. 52nd and Media	1858	Gray Iron	Light Machinery	5	J. H. Chambers	
Clark's Iron Foundry 36th & Grays Ferry	1898	Gray Iron Semi Steel	Chemical, Jobbing	30	Wm. M. McCullough	
Columbia Iron Foundry 1631 No. Fifth	1863	Gray Iron		10	Robert W. Trump	John Howarth, Sr.
Cramp Brass & Iron Foundries Co. Richmond & Norris Sts.	1830	Gray Iron Nonferrous	Marine, Diesel Engine Machinery		H. B. Taylor	N. H. Schwenk
Cresson-Morris Co. 18th & Allegheny Ave.	1859	Gray Iron Nickel Alloys	Machinery	25	P. H. Morris	John D. Miller
Creswell Iron Works 23rd & Cherry	1835	Gray Iron	Architectural, Jobbing	12	Samuel J. Creswell, Jr.	John H. Laucks
Thos. Devlin Mfg. Co. 23rd & Sedgley	1902	Malleable, Gray Iron	Fittings		S. S. Fretz	
Dodge Steel Co. 6501 Tacony	1920	Acid Electric Steel		7	C. Tolan	John R. Baush
H. G. Enderlein & Co. Whittaker & Roosevelt Blvd.	1923	Gray Iron, Nonferrous	Jobbing	4		H. G. Enderlein
Enterprise Mfg. Co. of Pa. Third & Dauphin	1866	Gray Iron, Nonferrous	Jobbing, Hardware	30	H. E. Asbury	Harvey Taylor
Fairmount Foundry, Inc. Third & Westmoreland	1906	Gray Iron	Machinery	25	Geo. M. Benkert	E. C. Benkert
Fletcher Works Second & Glenwood Ave.	1900	Gray Iron	Textile Machinery	10	Fletcher Schaum	C. E. Llewellyn
H. S. Getty & Co., Inc. 1015 W. Thayer	1922	Nonferrous	Hardware	⅓	John B. Eichel, Jr.	Frank Newbold
Girard College Philadelphia, Pa.	1849	Gray Iron Nonferrous	Machinery		Owen D. Evans	Henry Schriner
Glenwood Foundry 17th & Glenwood Ave.	1919	Gray Iron	Jobbing	7	W. B. Phelps	Robert Thompson
Hajoca Corporation 2211 E. Erie Ave.	1858	Brass, Nickel	Plumbing	4	Chas. J. Muend	J. Whitty
Halstead & Co. 1129 Cherry	1864	Nonferrous	Jobbing	¼	H. L. Halstead	H. W. Ellis
Hill Independent Mfg. Co. High & P. & R. R. R.		Brass, Aluminum				
Charles Hitz 2326 No. Fifth	1905	Nonferrous	Jobbing		Charles R. Hitz	
Horn & Brannen Mfg. Co. Broad & Willow	1878	Nonferrous	Electric Fixtures	½	Albert J. Brannen	John Shields
Huxley Bronze Casting Co. 106 Tasker	1913	Nonferrous	Jobbing	6	N. S. Huxley	
Janney Cylinder Co. 7425-31 State Road	1926	Nonferrous	Bushings, Liners, Sleeves		W. T. Janney	
Kappler-Fox Foundry Co. York & Thompson	1893	Gray Iron	Stoves, Jobbing	8	George Fox	
John P. Kelly 7126 Yocum	1916	Nonferrous	Jobbing	1	John P. Kelly	
M. L. Kirn & Bros., Inc. 2133 No. Laurence	1896	Nonferrous	Jobbing	2	Joseph F. Kirn	Joseph C. Sharpe
Kitson Company Westmoreland & Stokley	1897	Brass	Plumbing	2	A. E. Shaw	W. G. Densten
Koehler Lattimer Co. Church & Stiles	1923	Nonferrous	Jobbing	1		C. Waechter
Lindsay Foundry Co. 217 Krams Ave.	1880	Nonferrous	Machinery	3	A. C. Bowers	
J. E. Lonergan Co. 211 Race	1872	Bronze	Valves, Gauges	2	John E. Lonergan	J. P. Cavanaugh
The Midvale Co. Nicetown, Philadelphia, Pa.	1867	Gray Iron, Steel	Large Machinery	40	A. C. Dinkey	C. W. Yost

(*Concluded on Page 329*)

Convention City Has Many Foundries (Concluded)

Location, Personnel and Capacity of Casting Plants in Philadelphia

Name and Address	Established	Metal Melted	Class of Castings	Daily Output in Tons	President or General Mgr.	Foundry Supt.
Modern Brass Foundry Co. 315 No. 20th	1926	Nonferrous	Jobbing	1½	L. H. Baeuerle	
Moore & White Co. 15th & Lehigh	1885	Gray Iron Nonferrous	Machinery	7	Shelton A. Hibbs	Wm. S. Blessing
Morris Truck & Wheel Co. 760 So. 42nd	1916	Gray Iron	Truck Wheels, Jobbing	4	H. C. Naschke	R. J. Connell
Harry D. Mousley 2409-17 Cedar	1910	Nonferrous	Jobbing	5	H. D. Mousley	W. C. Lilly
North American Smelting Co. Ninth & Thompson	1865	Nonferrous	Jobbing		Wm. B. McLaughlin	
North Brothers Mfg. Co. Lehigh Ave. & American	1881	Gray Iron		20	A. C. Albrecht	John M. McQuilly
Northern Bronze Corp. 4212-20 Cresson	1923	Nonferrous	Jobbing	2	A. F. Leopold	J. J. Keeley
Joseph Oat & Son Third & Quarry	1789	Nonferrous	Machinery		Charles L. Beaumont	
Olney Foundry Co. 180 W. Duncannon Ave., Olney	1920	Gray Iron	Transmission Machinery, Jobbing	25	H. H. Cooke	J. B. Greenstreet
Pennsylvania Bronze & Brass Co., Inc. 22nd & Master	1922	Nonferrous	Jobbing	4	Chas. E. Schley	Howard Peltz
Pennsylvania Lawn Mower Co. 1615 No. 23rd		Gray Iron	Mowers	7	Wm. P. N. Braun	George F. Liener
Charles Perkes Co. 627 Arch	1875	Nonferrous	Jobbing	1	Louis King	Lewis Simonds
Perseverance Iron Foundry, Inc. 822 Latona	1857	Gray Iron	Jobbing	5	Clarence B. Lanning	J. N. Lanning
Philadelphia Hdwe. & Mall. Iron Wks. Ninth & Jefferson Inc.	1842	Gray Iron Malleable	Jobbing	5	Frederick M. Devlin	
Philadelphia Sash Weight Works Lewis & Ashland	1880	Steel Scrap	Sash Weights Elevator Weights	15	E. H. Fox	George J. Fox
Phosphor Bronze Smelting Co. 2200 Washington Ave.	1874	Phosphor Bronze	Jobbing	1½	Thos. L. Lueders	Earl Easteburn
Paul S. Reeves & Co. 1415 Catherine	1868	Nonferrous	Jobbing	6	E. J. Decker	Chas. Wilkinson
Ridgeway Brass Foundry 1304 Lemon	1922	Nonferrous	Jobbing	¼	John Bogschugz	
Rolle Casting Co. 2814 Bridge St.	1916	Nonferrous	Jobbing	1	Walter T. Rolle	Oswald Richards
Joseph Rosenthal's Sons, Inc. 190 Berks	1878	Nonferrous	Jobbing	2	Henry Rosenthal	Jack Plant
Thomas Savill's Sons Inc. N. E. Cor. Hancock & Huntingdon	1866	Nonferrous	Plumbing		Robert G. Savill	Wm. Zerwick
Schneider-Bowman Co., Inc. 1612 Van Dyke		Gray Iron	Jobbing	25	Louis Schneider	Marland T. Valentine
Wm. Schofield Co. 219 Krams Ave.	1901	Gray Iron	Textile Machinery	2½	Wm. Schofield	Wm. Richenbach
Simon Scullin Foundry Cambria & American	1884	Gray Iron	Jobbing	4	John L. Gregory	
Wm. Sellers & Co., Inc. 16th & Hamilton	1848	Gray Iron Brass	Machinery, Locomotive Injectors	23	Alexander Sellers	A. Plee
Sheeler-Hemsher Co. 811-15 Fairmount Ave.	1902	Nonferrous	Jobbing		J. H. Sheeler	
Josiah J. Steele 1212 Adams Ave.	1908	Nonferrous	Jobbing		Josiah J. Steele	
Sulzer & Co., Inc. 252 No. Eleventh		Brass	Lighting Fixtures		Herman W. Sulzer	
Harry C. Taylor & Co. Parkway & 20th	1923	Nonferrous	Jobbing	¾	O. H. Bauerle	
Turner Foundry & Machine Co. 917-25 W. Schiler	1902	Gray Iron Semi Steel	General Machinery Wheels & Gears	4	Thomas Turner	Joseph Blankley
Union Machine Works & Iron Fdy. 1821 So. Water		Gray Iron	Propeller		Francis McDonald	R. Jackson
U. S. Metallic Packing Co. 429 No. 13th	1872	Nonferrous	Bearings, Jobbing	8	E. Curtiss	S. W. Chappell
U. S. Navy Yard League Island	1800	Steel, Gray Iron, Nonferrous	Marine	1	R. M. Watt	C. L. Green
Vulcan Foundry Co. 2442 No. Tenth		Gray Iron Aluminum				
Westinghouse Elec. & Mfg. Co. So. Philadelphia Works	1917	Gray Iron Nonferrous	Turbines, Condensers, Pumps, Engines	50	H. T. Herr	Joseph Wynn
Wright Mfg. Co. 131 Master		Brass, Bronze	Church, Ornamental	¼	E. D. McGinness	
James Yocom & Son, Inc Philadelphia, Pa.	1837	Gray Iron	Machinery	5	H. C. Yocom	H. F. Rockenbach

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strengths of cast iron. The report of the committee on research will present its program at this time. The status of foundry coke specifications also will be discussed under W. A. Selvig, bureau of mines, and secretary of the A. S. T. M. committee on coke.

Nonferrous foundry problems will undergo scrutiny at two sessions, one of which will be a round table meeting. Refractories for nonferrous furnaces, proper feeding of risers and the founding requirements of No. 12 aluminum alloy will be dealt with in the other session.

Exchange papers from three European associations will be presented during the convention. F. A. Melmoth, Thomas Firth & Sons Ltd., Sheffield, England, will present the exchange paper of the Institute of British Foundrymen. Marcel Dudouet, Ecole Superieure de Fonderie, Paris, France, will present the exchange paper of the Association Technique de Fonderie de France, and Arthur Soupart, director, Musee Professional de L'Etat et des Ecoles Techniques de Morlanwelz, will present the exchange paper of the Association Technique de Fonderie de Belgique.

A session will be devoted to the growing subject of materials handling, and five papers covering different phases of the subject will be presented. Equipment of the standard type and that for control work on molding sand will be exhibited at the Commercial museum by the committee on molding sand research. An attendant will explain and demonstrate the apparatus.

Following the practice of the past few years, the association is sponsoring an apprentice contest in steel molding, gray iron molding and patternmaking. Local contests will be held in such foundry centers as Chicago, Milwaukee, the Quad Cities, Erie, Pa., etc., and the winning speci-

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Representative Foundries in Philadelphia District

Location, Personnel and Capacity of Casting Plants in Nearby Towns

Name and Address	Established	Metal Melted	Class of Castings	Daily Output in Tons	President or General Mgr.	Foundry Supt.
ALLENTOWN, PA.						
Adelaide Brass Works		Nonferrous	Bearings, Jobbing			
Aldrich Pump Co.	1914	Nonferrous, Semisteel	Pumps, Machinery	3	F. W. Mayer	Ben Baker
Brey & Krause Mfg. Co.		Nonferrous				
Daugherty Foundry Co.	1900	Gray Iron	Jobbing		G. H. Daugherty	
Kline Hardware Co.		Gray Iron, Aluminum	Jobbing, Hardware	5	Thos. W. Milnor	Jno. J. Roderick
Lehigh Valley Transit Co.	1921	Alloy Steel	Electric Railway	2½	H. F. Dicke	W. C. Klein
W. F. Mosser & Son	1863	Gray Iron, Semisteel	Machinery	20		Thos. Yates
Lloyd R. Spangler	1881	Gray Iron, Nonferrous	Jobbing	5	Lloyd R. Spangler	Samuel Zeigler
Traylor Engineering & Mfg. Co.		Gray Iron	Machinery		W. J. Roberts	
Vulcan Brass Works		Nonferrous	Jobbing			
BETHLEHEM, PA.						
Bethlehem Foundry & Machine Co.	1856	Gray Iron	Machinery		W. A. Wilbur	
Bethlehem Steel Corp.		Gray Iron, Steel, Nonferrous	Rolls, Ingot Molds		Eugene G. Grace	
Holland Furnace Co.		Gray Iron, Brass	Furnaces		A. H. Landwehr	
BIRDSBORO, PA.						
Birdsboro Steel Foundry & Mach. Co.	1894	Gray Iron, Steel	Rolls, Machinery	160	R. E. Brooke	
BOYERTOWN, PA.						
Eastern Foundry Co.	1922	Gray Iron	Soil Pipe, Fittings,	50	Edwin M. Rhoads	Harry R. Trout
Union Mfg. Co.	1894	Gray Iron	Stoves	4	John Z. Harner	Harvey W. Reichard
BRISTOL, PA.						
T. B. Harkins Foundry Co.	1886	Gray Iron	Jobbing	8	Jos. A. Brooks	
Pacific Steel Boiler Corp.		Steel, Gray Iron	Boilers		O. T. Nelson	
BURNHAM, PA.						
Standard Steel Works Co.	1831	Gray Iron, Steel	Locomotive	150	W. H. Leary	C. P. Vauclain
CAMDEN, N. J.						
Camden Brass & Aluminum Co.	1919	Nonferrous	Jobbing	¼	Walter Kozak	
Camden Brass Casting Co.	1921	Nonferrous	Machinery, Valves	1	Wm. H. Sinkinson	
Camden Foundry Co.	1892	Gray Iron	Jobbing	8	Benjamin Holt	W. B. Cannon
Eureka Brass Foundry	1913	Nonferrous	Jobbing	1	John S. Schwab	
Reeves Stove & Foundry Co.	1917	Gray Iron, Aluminum	Stoves, Furnaces			
Rosedale Brass Foundry		Aluminum	Jobbing			
CATASAUQUA, PA.						
Davies & Thomas Co.	1876	Gray Iron	Jobbing	100	S. M. Rutledge	H. W. Stolz
Hercules Metal Works	1904	Nonferrous	Bearings, Bushings	¼	J. A. Williams	
CHESTER, PA.						
American Locomotive Co.	1900	Steel	Locomotive	110	R. E. Fisher	W. E. Hoffman
American Steel Foundries	1902	Steel	Marine, Railroad	90	R. P. Lamont	J. F. Brown
Atlantic Steel Castings Co.	1915	Steel	Jobbing	20	Wm. A. Faison	
Crown Smelting Co.	1886	Nonferrous	Jobbing	2	Geo. T. Crumback	John M. Stewart
Federal Steel Foundry Co.	1906	Steel	Railroad Machinery	20	H. B. Taylor	Jas. G. Mitchell
Penn Steel Castings Co.	1892	Steel	Locomotive, Machinery	50	S. E. Sproul	F. Briner
Sharples Separator Co.	1878	Gray Iron	Compressors, etc.	25	F. S. Wood	J. M. Fackler
Sun Shipbuilding & Dry Dock Co.	1872	Gray Iron	Engine	5	John G. Pew	Jno. Wilkinson
P. J. Sweeney & Son		Nonferrous	Jobbing			
CHRISTIANA, PA.						
Christiana Machine Co.		Gray Iron	Jobbing		Charles Bond	W. D. Grant
COATESVILLE, PA.						
American Sash Weight Co.		Gray Iron	Sash Weights			
Coatesville Boiler Works		Gray Iron	Boiler Jobbing	12	Robert A. Locke	Wm. W. Spackman
Craig Ridgway & Son Co.	1887	Gray Iron	Jobbing		William H. Ridgway	
COLLEGEVILLE, PA.						
Freed Heater Co.	1903	Gray Iron	Heater	12	A. H. Pearson	
CRUM LYNNE, PA.						
Eagan-Johnson Steel & Iron Co.	1912	Steel	Jobbing	20	Daniel C. Eagan	
DARBY, PA.						
E. E. Brown & Co.	1888	Tin Scrap	Sash Weights	50	T. Harold Brown	Herbert Wertheim
DOYLESTOWN, PA.						
Doylestown Agricultural Co.	1851	Gray Iron	Agricultural, Jobbing	2	Jos. R. Ruos	Wm. Andres
EAST DOWNINGTON, PA.						
Downington Mfg. Co.	1880	Gray Iron, Brass	Paper Mill Machinery		Guyon Miller	
EASTON, PA.						
Easton Brass & Machine Works	1904	Nonferrous	Jobbing	1	R. S. Lippey	
Easton Foundry & Mfg. Co.		Gray Iron, Nonferrous	Jobbing			
Treadwell Engineering Co.	1910	Gray Iron, Steel	Jobbing, Machinery	50	A. A. Neave	S. B. Hood
Wm. Wharton Jr. & Co., Inc.	1859	Steel	Railroad, Jobbing	30	P. Chrystie	W. G. Hulbert
EDDYSTONE, PA.						
Baldwin Locomotive Works	1832	Gray Iron	Locomotive	75	S. M. Vauclain	J. L. Smith
FLORENCE, N. J.						
Florence Pipe Foundry & Machine Co.	1855	Gray Iron	Pipes, Valves, Machinery		Walter Wood	D. S. Peaks
GLOUCESTER, N. J.						
American Radiator Co.	1928	Gray Iron	Radiator	70	C. T. Drumplemann	J. C. Eschborn
Welsbach Co.	1900	Gray Iron, Nonferrous	Lights		Sidney Mason	
HATBORO, PA.						
Hatboro Foundry Co.	1920	Gray Iron	Stoves	15	Willis W. Wilgren	Chas. Hamburg
KUTZTOWN, PA.						
Kutztown Foundry & Machine Co.	1895	Gray Iron, Lead	Chemical Machinery	45	Arthur Bonner	Paul D. Barto

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Representative Foundries in Philadelphia District (Continued)

Location, Personnel and Capacity of Casting Plants in Nearby Towns

Name and Address	Established	Metal Melted	Class of Castings	Daily Output in Tons	President or General Mgr.	Foundry Supt.
LANCASTER, PA.						
Andes Foundry Co.	1920	Gray Iron	Toys, Jobbing	15	Eugene B. Andes	Earl Simmons
Barry & Zecher Co.		Gray Iron, Nonferrous	Machinery, Jobbing			
Burnham Boiler Corp.	1923	Gray Iron	Boiler	32	H. A. Schnitzer	G. A. Read
Carbon Steel Casting Co.		Gray Iron, Steel, Nonferrous	Hardware, Jobbing		A. J. Shenberger	
Champion Blower & Forge Co.	1875	Gray Iron	Blowers, Jobbing		C. B. Long	
C. H. A. Dissinger & Bros. Co., Inc.	1889	Gray Iron	Engine	10	C. H. A. Dissinger	
E. T. Fraim Lock Co.	1856	Gray Iron, Nonferrous	Lock Parts	1½	Samuel R. Fraim	Chas. Zimmerman
General Metal Products Co.	1923	Nonferrous	Jobbing	1	H. L. Schutte	
Hubley Mfg. Co.	1894	Gray Iron, Nonferrous	Toys, Art Castings, Jobbing	12		Edward Barto
Lancaster Foundry Co.		Gray Iron, Malleable, Nonferrous	Jobbing			
Lancaster Iron Works, Inc.	1910	Gray Iron	Machinery	4	W. W. Posey	W. P. Haun
Lancaster Malleable Castings Co.	1911	Malleable Iron, Nonferrous	Jobbing	10	H. Lloyd Hess	Cyrus H. Meminger
J. Walter Miller Co.	1886	Nonferrous	Special Hardware	1	J. Walter Miller	
Model Brass Foundry		Nonferrous			C. Haller Jr.	
Reese Padlock Co.		Brass	Hardware			
Safe Padlock & Hardware Co.		Nonferrous	Locks, Shelf Hardware	5	L. B. Hershey	Henry Presserly
LANSDOWNE, PA.						
Crucible Steel Casting Co.	1905	Steel	Jobbing	12	C. R. H. Cunningham	John J. Walsch
NEW CASTLE, DEL.						
American Manganese Steel Co.	1910	Steel	Railway		W. Brinton	Wm. W. Swayze
Deemer Steel Casting Co.	1907	Steel	Jobbing	10	Newlin T. Booth	Harry J. Rothrock
NORRISTOWN, PA.						
Cochrane Corp.	1863	Gray Iron	Heaters, Separators	8	John C. Jones	Geo. Johnstone
Fowler & Wolfe Mfg. Co.	1895	Gray Iron	Radiators		C. R. Fowler	John S. Grater
Norristown Foundry Co., Inc.	1924	Gray Iron	Heater Parts	5	Chas. G. O'Hara	James J. Hodnett
Wildman Mfg. Co.		Gray Iron, Nonferrous	Machinery, Jobbing		Kenneth Howie	
NORTH WALES, PA.						
North Wales Foundry Co., Inc.	1896	Gray Iron	Jobbing, Pressure Castings	4	John Patton	Robert Lane
North Wales Machine Co., Inc.	1907	Gray Iron	Machinery		F. M. King	
PALMYRA, N. J.						
Palmyra Foundry Co.	1920	Gray Iron, White Iron	Jobbing	10	E. F. Thum	Wm. Opfer
PHOENIXVILLE, PA.						
Madco Foundry & Machine Co.	1907	Gray Iron	Jobbing	9	S. W. Deininger	
Phoenix Iron Co.	1856	Gray Iron	Mill Fittings, Bridge Work	15	Frank P. Norris	Jos. Challingsworth
Railway Materials Co.		Gray Iron	Railway Supplies			
POTTSTOWN, PA.						
Bramcote Foundry & Mach. Works	1908	Gray Iron, Nonferrous	Jobbing	15	John A. Selinger, Sr.	
Colebrookdale Iron Co.	1835	Gray Iron, Nonferrous	Food Choppers, Sad Irons	9	O. W. Sabold	M. C. Schaeffer
Keystone Foundry Co.	1902	Gray Iron, Semisteel	Jobbing	4	Paul L. Morris	Wm. Yerger
Light Mfg. & Foundry Co.	1894	Nonferrous	Jobbing, Automotive	15	H. J. Bahr	T. L. Rutter
March-Brownback Stove Co.	1889	Gray Iron	Stoves, Jobbing	20	D. F. Printz	
Pottstown Brass Co.	1920	Nonferrous	Jobbing	1	George A. Mohn	
Pottstown Machine Co.	1926	Gray Iron			E. E. Saylor	
QUAKERTOWN, PA.						
Hajoca Corp.	1858	Brass, Nickel	Plumbing	4	Chas. J. Muend	
Quakertown Stove Works	1882	Gray Iron	Stove Plate	12	Joseph Cavanaugh	Chas. Hillegass
READING, PA.						
Chantrell Hardware & Tool Co.		Gray Iron, Brass	Builders Hardware			
Crescent Brass Mfg. Co.	1904	Nonferrous	Hardware		T. C. Christ	
Dick Bros., Inc.	1907	Gray Iron, Nonferrous	Plumbing		Charles K. Dick	
Empire Brass Mfg. Co.		Nonferrous	Jobbing			
Empire Steel Casting Co.	1921	Steel	Jobbing	5	Ray A. Houck	
Excelsior Brass Works	1898	Nonferrous	Jobbing	¾	H. H. Woodward	James Elbert
Franklin Brass Foundry Co., Inc.	1910	Nonferrous	Chandelier, Jobbing	1	I. Howard Treat	Claude Hoshauer
Glenside Metal Foundry Co.		Nonferrous				
Gray Iron Foundry Co.	1903	Gray Iron	Jobbing	15	S. J. Wagner	A. L. Frame
Mount Penn Stove Co.		Gray Iron	Stoves			
Penn Foundry & Mfg. Co.	1916	Gray Iron, Semisteel	Jobbing	10	Edward K. Mark	
Penn Hardware Co.	1877	Gray Iron, Nonferrous	Light Hardware	11	L. J. Heizmann	George Zieglu, Edwin Moser
Prizer-Painter Stove Co.	1892	Gray Iron	Stove Plate	7	S. F. Blatt	Wm. H. Bitting
Reading Brass Works		Nonferrous	Jobbing		E. R. Wicklein	
Reading Car Wheel Co.	1897	Iron	Chilled Iron Wheels	100	John B. Bowers	Jno. B. Kubacki
Reading Casting Co.	1913	Gray Iron	Jobbing	6	H. C. Bell	John Boyer
Reading Foundry & Supply Co.	1911	Gray Iron	Soil Pipe Fittings	35	John G. Fleck	Wm. Davies
Reading Hardware Corp.	1886	Gray Iron, Nonferrous	Builders Hardware, Mowers		George D. Horst	
Reading Iron Co.	1889	Gray Iron	General Machinery	200	L. E. Thomas	E. Johnson
Reading Knob Works	1917	Gray Iron, Nonferrous	Builders Hardware	7	George E. McCoy	Wm. Myers
Reading Scale & Machine Co.		Gray Iron	Boilers			
Reading Steel Casting Co.	1903	Steel	Railroad, Valves, Fittings	30	M. L. Johnson	J. Sonnenfeld
Reading Stove Works		Gray Iron	Stoves			
Speidel Elevator Corp.	1885	Gray Iron, Brass	Elevator Castings		J. G. Speidel	
Textile Machine Works	1900	Gray Iron, Nonferrous	Machinery	35	Henry Janssen	George Mayer
Union Bronze Co.	1909	Nonferrous	Bearings, Jobbing	2	Robert P. Fritch	John Witman
ROYERSFORD, PA.						
Buckwalter Stove Co.	1867	Gray Iron, Aluminum	Stoves, Furnaces		J. A. Buckwalter	
Floyd-Wells Co.	1883	Gray Iron	Stove Plate	15	R. D. Wells	Matthew Woodward
Grander Stove Co.		Gray Iron	Stoves, Heaters			
Ideal Specialty Mfg. Co.	1927	Gray Iron, Nonferrous	Plumbing, Stoves	10	D. G. A. Colley	Ed. Yeager
Royersford Foundry & Machine Co.	1890	Gray Iron	Transmission, Machinery	20	F. H. Deisher	T. B. Mackissic
SELLERSVILLE, PA.						
Sellersville Foundry & Machine Co.		Gray Iron				
U. S. Gauge Co.	1904	Nonferrous	Pressure and Vacuum Gauges	3	J. W. Place	Edw. D. Sarthness

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Representative Foundries in Philadelphia District (Concluded)

Location, Personnel and Capacity of Casting Plants in Nearby Towns

Name and Address	Established	Metal Melted	Class of Castings	Daily Output in Tons	President or General Mgr.	Foundry Supt.
SPRING CITY, PA.						
Keystone Stove Foundry		Gray Iron	Stoves			
Spring City Foundry Co.	1923	Gray Iron	Machinery, Ornamental	15	M. M. Marcus	
STOWE, PA.						
Stanley G. Flagg & Co.	1855	Gray Iron, Malleable	Pipe Fittings, Jobbing		Stanley G. Flagg	H. L. Smith
TRENTON, N. J.						
Billingham Brass & Machine Co.	1905	Nonferrous	Plumbers' Supplies	1	P. Billingham	Thos. Billingham
Crossley Machine Co.		Gray Iron	Machinery			
Fischer & Norris Eagle Anvil Works	1843	Gray Iron	Anvils, Vises	15	S. A. Andrew	
Litemetl Castings Corp.		Nonferrous	Jobbing			
Mackenzie's Sons Co.		Gray Iron	Jobbing			
McFarland Foundry & Machine Co.	1884	Gray, White and Chilled Iron	Jobbing, Wire Dies	10	J. H. Pennington	
J. L. Mott Co., Inc.	1828	Gray Iron, Nonferrous	Sanitary Plumbing, Ornamental	100 Iron 9 Brass	W. G. Probst	D. J. Kafer
National Radiator Corp.		Gray Iron	Radiators	200	Edwin Norris	
E. J. Scudder Foundry & Machine Co.		Gray Iron	Jobbing			
Skillman Hardware Mfg. Co.		Gray Iron, Brass	Hardware			
John E. Thropp's Sons Co.	1878	Gray Iron, Semisteel	Machinery	25	John E. Thropp	Ralph M. Ryan
Wm. R. Thropp Sons Co.		Gray Iron, Nonferrous	Machinery			
Trenton Brass & Machine Co.	1891	Nonferrous	Plumbing, Bearings, Jobbing	4	Wm. H. Schultz	Charles Brook
Trenton Bronze & Aluminum Co.		Nonferrous				
Trenton Emblem Co.	1918	Nonferrous	Jobbing, Pottery, Plumbing	1½	W. M. Hammond	
Trenton Malleable Iron Co.	1890	Malleable, Gray Iron	Jobbing	40	Frank J. Eppele	W. G. Bloor
WILMINGTON, DEL.						
Consolidated Mach. Tool Corp. of America	1854	Gray Iron	Machine Tool	15	G. W. Moreton	H. Templin
Delaware Bronze Co.		Nonferrous				
Du Pont Engineering Co.		Gray Iron, Nonferrous				
A. C. Layman Machine Co.	1908	Gray Iron, Nonferrous			Alfred Layman	
Lobdell Car Wheel Co.	1836	Gray and Chilled Iron, Nonferrous	Wheels, Jobbing	250	Geo. G. Lobdell, Jr.	W. S. Allmond, Jr
Pusey & Jones Corp.	1848	Gray Iron, Nonferrous	Machinery	30 Iron 7 Brass	Clement C. Smith	
Speakman Co.	1889	Brass	Plumbing	3	James Fraser	Neil Drury
Joseph A. Vogel Co.	1908	Brass	Valves	1	Joseph A. Vogel	
Wilmington Malleable Iron Wks.		Malleable	Jobbing			

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mens will be sent to the convention where prizes will be given by the A. F. A. for the best entries in each division.

Plans Entertainment

PHILADELPHIA, with its fine historic background, offers a pleasing prospect for the convention visitor. Throughout the city are preserved the buildings, grounds and many relics of the early colonial days, the patriotic shrines of the nation. The suburbs of Philadelphia, lying north along the Reading railroad and along the celebrated Old York road, west along the Pennsylvania railroad and south toward Wilmington, abound with large and magnificent estates. The city itself possesses an exceptionally large number of beautiful parks.

Committees composed of foundrymen and equipment and supply manufacturers in Philadelphia and the surrounding territory, have arranged a splendid program for the entertainment of those attending the convention. Sightseeing trips through Philadelphia and the surrounding territory, a luncheon and shopping trips are planned for the ladies. A special entertainment program and dance is being arranged for Thursday evening for the benefit of all convention visitors.

Special ladies registration headquarters will be maintained at the Bellevue-Stratford hotel, where members of the ladies entertainment committee will be in attendance to provide visitors with any information concerning the shopping facilities offered by the large stores of Philadelphia, points of interest, entertainment plans, etc. All ladies attending the convention are requested to register at their headquarters immediately upon arrival. Monday of convention week has been reserved for registration and the renewing of acquaintanceships.

On Tuesday afternoon at 2 o'clock the ladies will be taken on an interesting sightseeing tour over the city. This trip will include the central or business section of Philadelphia, Independence hall, Betsy Ross house, Curtis Publishing Co., the United States mint, the Baldwin Locomotive Works, the University of Pennsylvania, and Fairmount park. Among the points of interest to be seen in the park are the Zoological gardens, Memorial hall, Horticultural hall, and Wm. Penn house. The trip also will include a drive across the new Delaware river bridge and the party will return to the hotel by 4:30 p. m. Wednesday has been reserved for individual shopping trips, since many of the visiting ladies will wish to inspect Philadelphia's leading merchantile establishments.

An exceptionally ambitious program of entertainment has been arranged for the ladies on Thursday. The party will leave Philadelphia at 10 o'clock for Devon, passing through Fairmount park and out over the Lincoln highway. A luncheon will be served in the open gardens of Devon Park Inn. After the luncheon the party will be taken to Valley Forge where many of the points of interest, such as the burial ground of the Unknown Soldier, the statue of Major General von Steuben, the statue of Major General Anthony Wayne, the Pennsylvania memorial, the National Memorial arch, Washington's headquarters, etc., will be seen. At 3:30 p. m. the ladies will assemble at the Washington Memorial chapel where they will be greeted by Rev. W. Herbert Burk, rector, who is devoting his life's work to the building of this wonderful memorial. The party will return to the city over the Montgomery pike, arriving about 5 p. m.

One of the big features of the entertainment program for the week will be the vaudeville show and dance to be held Thursday evening in the auditorium of the new Scottish Rite Temple, located at the corner of Broad and Race streets. Special en-

tertainment features will start at 8 p. m., and after the show, a dance will be held in the spacious ballroom located immediately above the large auditorium. The new temple is one of the finest buildings in the city and the auditorium seats 2200 people.

Other entertainment features have been planned for the week by the American Foundrymen's association and other organizations. A dinner for equipment and supply manufacturers will be held on Monday evening at the Benjamin Franklin hotel under the joint auspices of the American Foundrymen's association and the Equipment Manufacturers' association. On Tuesday evening the American Foundrymen's association will give a complimentary dinner at the Manufacturers club to those far seeing and enterprising foundrymen and equipment and supply manufacturers who met in Philadelphia on May 12, 1896, and founded the American Foundrymen's association.

The annual banquet of the American Foundrymen's association will be held Wednesday evening, May 16, in the ballroom of the Bellevue-Stratford hotel. Further plans for this association activity will be announced in the Philadelphia daily edition of THE FOUNDRY. Following the banquet the Philadelphia committee will give a reception and dance. The Philadelphia committee also has arranged for several entertainment features to be given during the banquet. The numbers will include vocal and instrumental selections as well as orchestral music by Al. Hirsch's orchestra.

The golf committee has arranged for a golf tournament to be held at the Torresdale country club on Thursday. Arrangements also are being made to permit visitors to play at various other Philadelphia clubs during the week. Complete information on this event will be provided at the registration headquarters in the Commercial museum.

Hold Open House

MANY plants in the Philadelphia district will be open for inspection by visiting foundrymen. The Philadelphia plant visitation committee will have a desk at the registration headquarters in the Commercial museum where complete information on the plant visitation program may be obtained. Among the plants which will be open for inspection during the week of the convention are the following: Wildman Mfg. Co., Norristown, Pa.; Westinghouse Electric & Mfg. Co., Philadelphia; Trenton Malleable Iron Co., Trenton, N. J.; Tabor Mfg. Co., Philadelphia; William Sellers & Co. Inc., Philadelphia; Rolle Casting Co., Philadelphia; Precision Grinding Wheel Co., Philadelphia; Penn Steel Castings Co., Chester, Pa.; Palmyra Foundry Co. Inc., Palmyra, N. J.; Olney Foundry Co., Philadelphia; Fourth Naval District, Navy Yard, Philadelphia; Kutztown Foundry & Machine Co., Kutztown, Pa.; Kitson Co., Philadelphia; Hajoca Corp., Philadelphia; Glenwood Foundry, Philadelphia; Florence Pipe Foundry & Machine Co., Florence, N. J.; Fletcher Works, Philadelphia; Federal Steel Foundry Co., Chester, Pa.; Fairmount Foundry, Inc., Philadelphia; Egan-Johnson Steel & Iron Co., Crum Lynne, Pa.; Downington Mfg. Co., Downington, Pa.; Dodge Steel Co., Philadelphia; Crucible Steel Casting Co., Lansdown, Pa.; Cochrane Corp., Philadelphia; Bureau Bros., Philadelphia; Brinton Foundry Co., Philadelphia; Bethlehem Steel Co., Bethlehem, Pa.; American Engineering Co., Philadelphia; Ajax Electrothermic Corp., Ajax Park, N. J.; Aetna Foundry Co. Inc., Philadelphia and the Cresson-Morris Co., Philadelphia.

Several plants not directly related to the iron and steel industry also will be open for inspection during the convention. These will include the Edward G. Budd Mfg. Co., Philadelphia; Campbell Soup Co., Camden, N. J.; Curtis Publishing Co., Philadelphia; Philadelphia Inquirer, Philadelphia; Sun Shipbuilding & Dry Dock Co., Chester, Pa.; and the Victor Talking Machine Co., Camden, N. J.

Philadelphia Foundrymen Entertaining A. F. A.

General Committee

G. H., Clamer, Ajax Metal Co., general chairman.
W. J. Rice, Ajax Metal Co., secretary.
C. F. Hopkins, Ajax Metal Co.
W. G. Summers, Phoenix Iron Co.
Laird U. Park, Park & Williams Inc.
B. H. Johnson, Cresson-Morris Co.
J. A. Davies, Westinghouse Electric & Mfg. Co.
Walter L. Kalbach, 12th and Olive streets.
Earl S. Sparks, Metal Manufacturers Association of Philadelphia.
Frederick M. Devlin, Philadelphia Hardward & Malleable Iron Works.
Ralph Belleville, Joseph Dixon Crucible Co.
T. H. Addie, American Manganese Bronze Co.

Finance Committee

C. F. Hopkins, Ajax Metal Co., chairman.
W. G. Summers, Phoenix Iron Co., treasurer.
Laird U. Park, Park & Williams Inc.

Reception Committee

Laird U. Park, Park & Williams Inc., chairman.
C. F. Hopkins, Ajax Metal Co.
C. H. Newcomb, Rogers Brown & Crocker Bros., Inc.
R. B. Schaal, Roberts & Mander Stove Co., Hatboro, Pa.
George M. Benkert, Fairmount Foundry Co.
Minter T. Dean, Keystone Coal & Coke Co.
John M. Robb Jr., Park & Williams Inc.
P. R. Ramp, Newport News Ship Building & Dry Dock Co., Newport News, Va.

Plant Visitation Committee

B. H. Johnson, Cresson-Morris Co., chairman.
A. P. Lee, Wm. Sellers & Co.
J. B. Greenstreet, Olney Foundry Co.
Harry J. Winters, J. S. McCormick Co.
Charles M. Holcomb, Foundry Equipment Co.
J. D. Miller, Cresson-Morris Co.
C. E. Schley, Pennsylvania Bronze & Brass Co.
J. A. Davies, Westinghouse Electric & Mfg. Co.
W. B. Coleman, W. B. Coleman & Co.
R. B. Van Norman, Cleveland Pneumatic Tool Co.
M. R. Taggart, Paxson-Taggart Co.
J. A. Strecker, Cochrane Corp.
C. H. Raush, Whitehead Metal Products Co.
B. T. Covington, Bartlett-Hayward Co., Baltimore.
Wm. J. Shennan, Paxson-Taggart Co.
C. R. Spare, Janney Cylinder Co.
C. Walter Yost, Midvale Co.
C. S. Roberts, Dodge Steel Co.

Hotel Committee

J. A. Davies, Westinghouse Electric & Mfg. Co., chairman.
J. A. Martin, Westinghouse Electric & Mfg. Co.
Joseph Wynn, Westinghouse Electric & Mfg. Co.

Transportation Committee

Walter L. Kalbach, Twelfth and Olive streets, chairman.
A. P. Lee, Wm. Sellers & Co.
H. L. Hennzey, Carborundum Co.

Publicity Committee

Earl S. Sparks, Metal Manufacturers Association of Philadelphia.
John Morris Combs, Combs Advertising.
Thomas D. Richter, Philadelphia Chamber of Commerce.

Entertainment Committee

Frederick M. Devlin, Philadelphia Hardware & Malleable Iron Works, chairman.
J. Howard Sheeler, Sheeler-Hemsher Co.
Frank Krug Jr., White & Bro. Inc.
Joseph Rettig, Lansdale Foundry Co. Inc., Lansdale, Pa.

Ladies Entertainment Committee

Ralph Belleville, Joseph Dixon Crucible Co., chairman.
Frank Krug Jr., White & Bro. Inc.
W. G. Summers, Phoenix Iron Co.

Golf Committee

T. H. Addie, American Manganese Bronze Co., chairman.
Harry A. White, White & Bro. Inc.
Parker Smith, Smith Drum & Co.

Members Ex-Officio of All Committees

Walter Wood, R. D. Wood & Co., president, Philadelphia Foundrymen's association.
Howard Evans, Union League, secretary, Philadelphia Foundrymen's association.

EXHIBITION TO FEATURE *Foundry Equipment Developments*

WHEN the doors of the exhibition hall at Philadelphia are thrown open to the foundry world on Monday morning, May 14, those progressive foundrymen who have journeyed to Philadelphia for the thirty-second annual convention and exhibition of the American Foundrymen's association, will view the greatest collection of foundry equipment and supplies ever gathered under one roof. Representatives of every class of labor-saving equipment utilized in the production of castings and samples of practically all materials used in foundry practice will be displayed in the main exhibition hall of the Commercial museum.

Credit for much of the progress in the foundry industry belongs to the enterprising manufacturers of equipment and supplies, who have spent both time and money to develop machines and other materials to the high state of perfection exemplified in advanced foundries today. While improvements in mechanical equipment have continued steadily from year to year, the keen competition, which is being felt throughout the entire industrial world, probably has resulted in a greater number of developments during the past year than in any similar period in the history of the foundry industry. For that reason, the 1928 exhibition will establish a high record for new developments shown.

In addition to the displays of equipment and supplies, an exhibition of steel, malleable and gray iron castings will be inaugurated this year. The steel castings display will be sponsored by the Steel Founders Society of America, the malleable by the Malleable Iron Research institute and the gray iron by a committee composed of men interested in the production of that class of castings. This exhibition will lead those interested in the foundry industry to appreciate the engineering possibilities of castings.

Floor plans, lists of exhibitors, a description of the individual exhibits and the company representatives at the convention follow:

A

ABRASIVE CO., Philadelphia—Two types of grinding wheels, one designed to grind cast iron and unannealed malleable iron and the other for snagging steel castings, will be featured by this company. The display also will include grain, bricks, sticks and stones. The representatives will be L. R. Burnes, E. M. Wilkinson, J. F. Fischer, Samuel Hershey, R. A. Shaffer, W. A. Ruppel and I. R. Blair.

ABRASIVE INDUSTRY, Cleveland—The booth of this company will be fitted up as a rest room where those in attendance at the convention are invited to make their headquarters. The representatives will be J. D. Pease, H. Cole Estep, G. B. Howarth, J. F. Ahrens, Herbert R. Simonds and B. K. Price.

THE ADAMS CO., Dubuque, Iowa—A line of foundry equipment, including jolt squeezers, pneumatic sand riddles, snap flasks, slip flasks, steel jackets, steel bands, vibrators, rappers, sprue cutters and steel bottom plates will be featured at the booth of this company. The representatives will be Waldo Adams, Lester A. Demkier, W. J. Spensley and John A. Cameron.

AIR REDUCTION SALES CO., New York—This company will exhibit tanks of oxygen, acetylene and carbide and apparatus for oxy-acetylene welding and cutting. Argon, neon, helium and other rare atmospheric gases also will be shown. Demonstrations will be made with hand welding and cutting outfits and motor driven machines for oxyacetylene cutting. W. W. Barnes, W. H. Eliason, H. B. Hand, J. F. High, C. D. Trout, W. H. Humphrys, C. S. Peters, H. L. Rogers, R. F. Helmkamp and F. Judelsohn will represent the company.

AJAX ELECTROTHERMIC CORP., Trenton, N. J.—Several types of high frequency electric furnaces and various accessories will be featured at the exhibit of this company. The representatives will be G. H. Clamer, Edwin F. Northrup, Dudley Wilcox and R. N. Blakeslee.

AJAX METAL CO., Philadelphia—Various types of brass and bronze ingot metals, babbitt metals and castings produced from ingot metals manufactured by this company will be displayed. Another feature of the exhibit will be an induction type electric furnace. The company will be represented by G. H. Clamer, W. J. Coane, Frank M. Willeson, Zeno D. Barnes, A. MacDougall, J. Millson Graham, S. E. McClure, J. C. Brightbill, R. J. Keeley, J. R. Wyatt, Henry Geiseke, William Adam.

ALBANY SAND & SUPPLY CO., Albany, N. Y.—Numerous samples of foundry sand will be on display at the booth of this company. The representatives will be Lawrence Murray, M. J. Slater and Theodore Dwight.

ALLOYS PRODUCTS INC., New York—A large number of alloys used in brass foundry practice will be shown by this company.

ALPHA-LUX CO. INC., New York—A miniature cupola lined with the monolithic lining manufactured by this company will be on exhibition. Samples of the lining in its raw state also will be shown. The company will be represented by W. E. Leuchtenberg, H. C. Elliott, R. W. Deimel, C. J. Harney and W. Pickard.

AMERICAN BRAKE SHOE & FOUNDRY CO., Chicago—Special types of annealing pots will be shown by this company.

AMERICAN ENGINEERING CO., Philadelphia—This company will show a 1-ton plain trolley hoist with foundry control, a 2-ton hoist with cage control, a new ¼-ton hoist which recently has been introduced, as well as other types of monorail and stationary hoists. The new ¼-ton hoist will be shown with plain

trolley, bolt suspension and hook suspension. The exhibit will be in charge of R. H. McGredy.

AMERICAN FOUNDRY EQUIPMENT CO., Mishawaka, Ind.—A variety of foundry equipment will be displayed at the booth of this company. The materials shown will include a rotary type sandblast room having a pit underneath; two new sandblast mills, together with loading and unloading equipment; a small sandblast barrel; sandblast cabinets; sandblast tanks; a new sand-cutting machine which is designed to cut, screen and pile sand; other types of sand-cutting machines; an extrusion type core machine, a rod straightening machine; and aluminum flasks. With the exception of the cabinet type sandblast and the sandblast tanks, this equipment will be in operation. The company personnel in attendance will be as follows: Verne E. Minich, Hutton H. Haley, Fred Graf Jr., Otto A. Pfaff, James Rigby Jr., Charles D. Steinmeier, Charles L. Benham, George Crivel, Ferdinand G. Schultz, John D. Alexander, E. J. Turnbull, Jerome E. Sweet, C. B. Schneible, R. S. Judah and Thomas M. Slater.

AMERICAN MONORAIL CO., Cleveland—Overhead monorail conveying equipment will be featured by this company. The display will consist of overhead monorail tracks, trolleys, switches, cranes, chain hoists, electric hoists, etc. The representatives will be L. E. Gaston, J. W. Clokey, F. C. Harris, J. P. Lawrence, H. M. Miller and B. D. Jeffs.

AMERICAN SAW MILL MACHINERY CO., Hackettstown, N. J.—Woodworking machinery for foundry use will be shown by this company.

AMERICAN STEEL ABRASIVES CO., Galion, O.—Samples of steel abrasives for the foundry cleaning room will be on display at the booth of this company.

AMERICAN VENT WAX CO., Lockport, N. Y.—Spools of various types of vent wax used for venting cores and a number of cores made with this type of wax will be shown by this company. N. L. Nankey will have charge of the exhibit.

AMES SHOVEL & TOOL CO., Boston—Numerous types of molders' shovels and scoops will be on display at the booth of this company.

ARCADE MFG. CO., Freeport, Ill.—This company will show a number of hand operated and power operated molding machines including jolt squeezers, jolt strippers and air strippers. Core machines and pouring outfits also will be shown. The company will be represented by L. L. Munn, B. C. Trueblood, Mentor Wheat, H. T. Tscherning, V. S. Firestone, August Christen, Herman Kasten, R. E. Turnbull, G. D. Wolfley, Herman Meyer and Wm. Herman.

ASBURY GRAPHITE MILLS, Asbury, N. J.—This company will have a special display of plumbago and graphite. The exhibit will be in charge of H. M. Riddle Sr., W. W. Butts and Walter Field.

AUSTIN CO., Cleveland—Methods applied to the development and construction of complete foundries will be featured by models, photographs, plans and reports at the booth of this company. The use of labor saving equipment also will be illustrated. The representatives will be G. A. Bryant, H. E. Stitt, O. D. Conover, J. C. Childs, Chas. E. Covell and E. F. Scott.

AUTOMATIC TRANSPORTATION CO. INC., Buffalo—Electric industrial trucks will be shown and demonstrated at the booth of this company.

AXMANN SAND-THROWING MACHINE CO., Cleveland—Machines in operation, conditioning sand, filling overhead bins, conveying sand from one location to another, etc., will be shown by this company. The representatives will be S. L. Dryfoos, Eric Wisbrun, C. M. Holcomb, E. J. Welter and M. A. Beltaire Jr.

AYERS MINERAL CO., Zanesville, O.—Molding sand for ferrous and nonferrous castings will be shown at the booth of this company. Silica sand for steel moldings also will be displayed.

B

BAKER-RAULANG CO., Cleveland—Several types of electric trucks and an electric truck-crane will be shown by this company. Representatives will be H. B. Greig, C. H. Remde, S. M. Conant, H. W. Faunt Le Roy, Nathaniel Platt, Harry Sherer and D. L. Darnell.

C. O. BARTLETT & SNOW CO., Cleveland—The exhibit of this company will consist of full size units for conditioning foundry sand. The following items will be exhibited: Continuous sand blender, pug mill, conditioner, elevator, conveyor parts, as well as photographs of installations of continuous molding and pouring equipment and a moving picture of a large production foundry in operation. The company

will be represented by H. L. McKinnon, H. C. Orr, M. E. First, W. W. Dodge, W. H. Norrington, Oliver S. Kelley and C. W. Ross.

H. L. BAUMGARDNER CORP., Chicago—Tapered slip flasks and a line of core oil will be featured at the booth of this company. The display will be in charge of H. L. Baumgardner.

BAUSCH & LOMB OPTICAL CO., Rochester, N. Y.—This exhibit will consist of optical and scientific instruments which are used by machine tool and steel treating companies. The equipment will consist of a photomicrographic camera, microscopes of various descriptions, brinell microscope, etc. The representatives will be I. L. Nixon, Mr. Stevens, E. H. Athes and J. A. Scheick.

BEARDSLEY & PIPER CO., Chicago—This company will exhibit both a motive type and a tractor type sandslinging machine. Both of these machines will be in operation making molds on the exhibition floor. The company representatives will be E. O. Beardsley, W. F. Piper, E. O. Connor, W. E. Naylor, N. W. Stratford, R. Arbuckle, P. Stefan, A. V. Magnuson, A. L. Miller, E. L. Mitchell, F. J. Opatrny, W. C. Scherby, H. G. Schlichter, R. R. Snow and C. Suess.

BERKSHIRE MFG. CO., Cleveland—Three types of plain squeezer molding machines, two types of jolt squeezer molding machines, one plain squeeze pattern draw machine, vibrators, valves, flasks and riddles will be shown by this company. The exhibit will be in charge of Guy L. Cannon and Horace F. Henriques.

BETHLEHEM STEEL CO., Bethlehem, Pa.—An automobile engine block, a carburetor casting, an electric refrigeration cylinder castings, die castings and numerous other types of castings containing pig iron manufactured by this company will be shown at its booth. The exhibit also will include fractures of many different grades of foundry iron. R. MacDonald, F. T. Fisher and Mr. Pritchard will represent the company.

BIAX FLEXIBLE SHAFT CO., New York—This company will exhibit flexible shaft for foundry application.

BLACK & DECKER MG. CO., Towson, Md.—This company will exhibit a complete line of portable electric tools including drills, screw drivers and socket wrenches, tappers, stud setters, grinders and sanders. S. Duncan Black, W. C. Allen, R. D. Black, L. H. Denton and W. A. Marschke will represent the company.

BLACK DIAMOND SAW & MACHINE WORKS, Natick, Mass.—A band saw filing and setting machine, a circular saw filer, a combination ,knife and circular saw grinder, band saw guides and metal cutting band saw blades will be shown by this company. The representatives will be Chas. A. Ambler and Oscar W. Swangren.

BLAW-KNOX CO., Pittsburgh—Clam shell bucket, regenerative air preheaters, standard steel buildings, and steel grating and flooring will be featured by this company.

BLOOMSBURY GRAPHITE CO., Bloomsbury, N. J.—This company will be represented by Edwin R. Wolverton, G. M. Murphy and M. F. Murphy.

BOTFIELD REFRACTORIES CO., Philadelphia—This company will exhibit a line of refractories for use in the foundry.

BOX CRANE & HOIST CORP., Philadelphia—Various types of cranes for use in the foundry will be exhibited by this company.

BRADLEY WASHFOUNTAIN CO., Milwaukee—This company will exhibit special fixtures for a foundry washroom which are foot controlled and equipped with liquid soap dispensers. Alec Hicks will have charge of the display.

BRIDGEPORT SAFETY EMERY WHEEL CO., Bridgeport, Conn.—This company will show a variety of grinding machines including a radial swing frame grinder, direct driven floor grinders, etc.

BROWN INSTRUMENT CO., Philadelphia—This company will exhibit measuring and recording instruments and will be represented by R. P. Brown, G. W. Keller, J. P. Goheen, L. M. Morley, Mr. Lukens and Mr. Knoblauch.

BUCKEYE PORTABLE TOOL CO., Dayton, O.—This company will exhibit a line of grinders for vitrified, rubber and bakelite bonded wheels in various sizes. Special right angle grinders, surface grinders, sanding machines, drills, nut drivers and screw drivers also will be shown. The exhibit will be in charge of W. W. Price, H. O. Gummere, W. R. Gummere, G. A. Barden.

C

CAMPBELL-HAUSFELD CO., Harrison, O.—Melting furnaces using either oil or gas fuel, noncrucible furnaces of the tilting type and the barrel type, tilting type crucible furnaces and stationary type crucible furnaces, strainers and motor driven oil pumping units will be shown at the booth of this company. The representatives will be J. S. Armour and E. B. Hausfeld.

CARBORUNDUM CO., Niagara Falls, N. Y.—This company will show a complete line of snagging wheels, a small core oven, a model of a malleable iron annealing furnace lined with refractories made by the company, a small pot type nonferrous melting furnace and a display of a high temperature furnace showing heating elements and terminals in actual operation. The representatives will be S. F. Courter, W. J. Griffith, G. T. Kretschmar, E. C. Maguire, H. L. Henszey, J. G. Fritzinger, J. A. King, F. W. Miller, E. W. Woodruff, C. E. Hawke, S. A. Fenno, H. N. Shaw and Arnold Pfau Jr.

CARR FASTENER CO., Cambridge, Mass.—This company will show a complete industrial lubrication service for foundry and other mechanical equipment as well as compressors, fillers, fittings, tanks and automatic reservoir cups.

CHICAGO CRUCIBLE CO., Chicago—Graphite crucibles and special graphite refractories will constitute the display of this company.

CHICAGO PNEUMATIC TOOL CO., New York

—This company will exhibit an air compressor, chipping hammers, sand rammers, riveting hammers, air grinders, pneumatic drills, pneumatic wood-borers and air hoists. A line of electric grinders, drills, reamers, nut runners and a frequency changer also will be shown. The following will represent the company: A. E. Goodhue, Mr. Huvane, T. P. Harris, E. F. Eissler, Mr. Estergreen, P. J. Christy, H. G. Barbee, L. J. Walker, A. C. Andresen, W. C. Straub and A. M. Brown.

CHISHOLM-MOORE MFG. CO., Cleveland—This company will show in operation a cupola charging machine; an overhead traveling crane; a new high speed chain hoist; a roller bearing hoist with hand wheel extension which is designed especially for handling flasks, ladles of molten metal, etc., an electric hoist equipped with special foundry control; and special cutout models showing the working mechanism of this equipment. J. R. Mears, F. F. Seaman, W. H. Morgan, E. S. Ludlow and G. L. Hunt will represent the company.

CLARK TRUCTRACTOR CO., Battle Creek, Mich.—Gasoline propelled industrial vehicles of the tractor and the lifting type will be shown by this company.

CLEARFIELD MACHINE CO., Clearfield, Pa.—This company will exhibit sand conditioning machinery.

CLEVELAND ELECTRIC TRAMRAIL, Wickliffe, O.—A working exhibition of monorail equipment especially suitable for foundry use will be featured by this company. It will consist of the necessary crane runway, with a standard underslung type crane having a 28-foot span, and a track system of monorail on which a number of types of carriers will be operated, including a push button pouring device, a turntable pouring device operated and controlled from the operator's cab, a rack carrier for conveying flasks. A drop section also will be incorporated in the runway to permit the raising and lowering of carriers from one track elevation to another.

CLEVELAND FLUX CO., Cleveland—This company will show a sample of its line of fluxes and partings. The company will be represented by Clifford Cornell, C. D. Pinkerton, Elmer Kalal and Miss Esperin.

CLEVELAND PNEUMATIC TOOL CO., Cleveland—A line of chipping hammers and grinders for the foundry cleaning room and several sizes of rammers for floor, bench and flask ramming, will be shown at the booth of this company. A new large type rammer, designed especially for pit work, also will be shown, as well as various types of air appliances now in use in foundries. The various pieces of equipment will be shown in operation. The company will be represented by J. A. Dockery, B. H. Tripp, R. B. Van Norman, R. E. Manning, Arthur Scott and H. S. Covey.

CLIPPER BELT LACER CO., Grand Rapids, Mich.—The exhibit of this company will consist of models of belt lacers, belt fasteners, belt cutters and connecting pins. A special speed type lacer which is designed to lace both ends of an eight-inch belt in 1½ minutes also will be shown. The display will be in charge of Carl P. Field.

THOMAS E. COALE LUMBER CO., Philadelphia—This company will show a line of pattern lumber. Representatives will be Thomas E. Coale, T. F. Dalrymple, A. L. Conrad, S. D. Pettit, Harry Walters, George P. Dewitt, Jos. J. Salvatore, A. N. Hawkins and Jim Wood.

COMBINED SUPPLY & EQUIPMENT CO. INC., Buffalo—A line of foundry chaplets will be exhibited by this company under the direction of Stephen LeViness Jr. and E. E. LeViness.

CORN PRODUCTS REFINING CO., New York—The exhibit of this company will consist of samples of core binder.

D

DAILY METAL TRADE, Cleveland—The booth of this company will be fitted up as a rest room where those in attendance at the convention are invited to make their headquarters. The representatives will be J. D. Pease, F. V. Cole, George O. Hays, L. C. Pelott, E. C. Kreutzberg and William T. McCall.

DAYTON OIL CO., Dayton, O.—A complete display of its line of core oils and a number of cores manufactured from these various types of oils will be featured at the booth of this company. The exhibit will be in charge of D. S. Hopping, G. A. Storer, E. A. Gilbert and F. Gomersall.

DEBEVOISE-ANDERSON CO., New York—This company will exhibit samples of foundry coke.

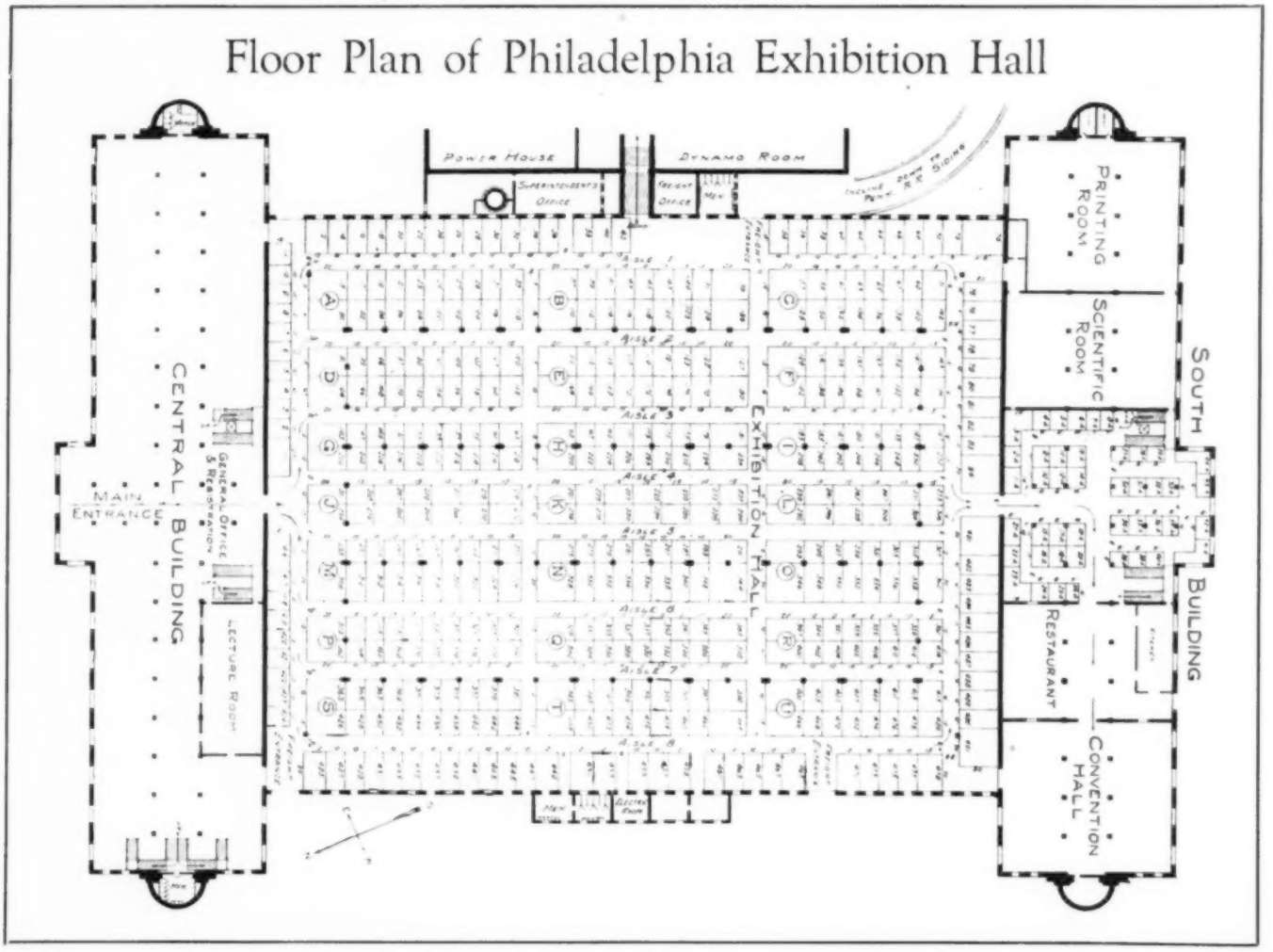
DECATUR MILLING CO., Decatur, Ill.—This company will exhibit samples of its dry core binder.

DEISTER CONCENTRATOR CO., Fort Wayne, Ind.—A mobile type foundry screen designed for small foundries where the screening and riddling is performed after the molds have been shaken out, will be featured by this company. The exhibit will be in charge of N. Rhune.

WM. DEMMLER & BROS., Kewanee, Ill.—This company will exhibit a machine for blowing various types of cores.

DETROIT ELECTRIC FURNACE CO., Detroit—A 350 pound, 100 kilowatt electric furnace will be exhibited by this company. The furnace will show the complete installation, including

Floor Plan of Philadelphia Exhibition Hall



the transformer and control equipment, in operation. The company also will exhibit a group of castings made from metal melted in the electric furnace. The company will be represented by Ed. L. Crosby, A. E. Rhoads, L. C. Wilson, L. B. Barker and F. A. Herrmann.

DE WALT PRODUCTS CO., Leola, Pa.—A special type of woodworking machine which may be used in pattern shops and in making flasks and core boxes will be shown in operation at the booth of this company. The exhibit will be in charge of W. Ross Stevens, E. L. Duncan and T. E. Brown.

DIAMOND CLAMP & FLASK CO., Richmond, Ind.—A line of molding equipment consisting of snap flasks, steel jackets, bands, core plates, bottom plates, core boxes, foundry wedges, clamps and flask fittings will be displayed at the booth of this company under the direction of E. A. Kinley and F. J. Gartside.

HARRY W. DIETERT, Detroit—A line of sand control and sand testing equipment designed to meet A. F. A. specifications will be shown at this exhibit. Equipment will be demonstrated for making permeability, fineness, moisture and strength tests. An automatic shutoff water meter, a laboratory size sand mixer and an iron temperature recorder for cupolas also will be shown. The exhibit will be in charge of Harry W. Dietert.

JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.—Crucibles, nozzles, stoppers and clay refractories will feature the exhibit of this company. The representatives will be R. R. Belleville, E. M. Cabaniss, R. F. Leonard and H. Eichwald.

E

EASTERN CLAY PRODUCTS INC., Buffalo—This company will exhibit samples of various clays which they manufacture. The company's representatives will be S. H. Cleland, N. J. Dunbeck, R. L. Cleland, R. S. Holland, C. B. Schureman and G. H. Barnes.

EASTERN STEEL CASTINGS CO., Newark, N. J.—A ball bearing type roller conveyor developed to transport green sand molds in flasks or snap flask molds will be featured by this company. A variety of steel castings including a new cast steel automotive wheel also will be shown. The representatives will be W. D. Sargent, E. F. Miltenberger, H. S. Otto, F. D. Campbell, A. L. Bussman, M. C. Renshaw, M. R. Wolf, C. Rampolla, G. Nelson, F. Paffrath, W. Cadwallader, O. D. Fedderman, S. McClure and F. Sieder.

D. A. EBINGER SANITARY MFG. CO., Columbus, O.—This company will exhibit a line of washroom fountain equipment for industrial plants.

EDISON STORAGE BATTERY CO., Orange, N. J.—This company will exhibit a line of

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storage batteries for industrial use.

ELECTRIC STORAGE BATTERY CO., Philadelphia—Batteries for propelling electric industrial trucks and tractors will be featured by this company. William Van C. Brandt, William C. Hooven, J. L. MacBurney, W. W. MacCallum and E. C. Kline will represent the company.

ELECTRO REFRACTORIES CORP., Buffalo—Special crucible and refractory brick will be shown by this company.

ELWELL-PARKER CO., Cleveland—This company will show various types of industrial electric trucks for foundry use and will be represented by F. B. Neely and R. F. Crawford.

F

FANNER MFG. CO., Cleveland—A complete line of foundry chaplets and tumbling mill stars will be shown by this company. The representatives will be J. R. Raible, C. G. Raible, S. H. Gibson, E. Durnat, C. E. Ireland, P. D. McDonnell and F. W. Beck.

FEDERAL FOUNDRY SUPPLY CO., Cleveland—This company will exhibit and demonstrate sand control apparatus used in foundry laboratories, and samples of foundry supplies. The company will be represented by Ralph Ditty, R. H. Heyl, T. H. Terry, G. H. Donoghue, Elmer Ditty, George A. Fuller, O. E. Peterson, Walter Gerlinger and T. J. Brown.

FOUNDRY EQUIPMENT CO., Cleveland—A rolling drawer type core oven, portable rack type core oven, continuous core oven, and enlarged photographs of installations will be featured at the booth of this company. The following will represent the company: C. A. Barnett, H. W. Steindorf, M. A. Beltaire Jr., E. J. Welter and C. M. Holcomb.

FOUNDRY MANGANESE CO., Philadelphia—Samples of ferromanganese, ferrosilicon and ferrochrome will be exhibited by this company.

THE FOUNDRY, Cleveland—The booth of this magazine will be fitted up as a rest room where the visitors at the convention are invited to make their headquarters. The representatives will be H. Cole Estep, Dan M. Avey, Pat Dwyer, Frank G. Steinebach, Chas. Vickers, Edwin Bremer, E. C. Kreutzberg, B. K. Price, Herbert R. Simonds, J. D. Pease, G. B. Howarth, J. F. Ahrens, L. C. Pelott, F. V. Cole, and W. T. McCall.

FOWLER & UNION HORSE SHOE CO., Buffalo—Nails for use in the foundry will be shown at the booth of this company.

G

GENERAL ELECTRIC CO., Schenectady, N. Y.—The exhibit of this company will consist of welding equipment, motors and control equipment, and a foundry cupola blowing installation. The cupola blowing equipment is equipped with an automatic device to insure a constant weight of air to the cupola, irrespective of atmospheric conditions and resistance through the cupola. The exhibit will be in charge of T. H. Reeves.

GIRARD SMELTING & REFINING CO., Philadelphia—This exhibit will consist of a line of nonferrous metals in both ingot and casting form. The representatives in attendance will be Albert Hanak, Joseph Axelrod, Louis Schwab, Albert Katz and Maurice Sall.

GLOBE STEEL ABRASIVE CO., Mansfield, O.—Samples of steel grit and steel shot for blast cleaning, and castings which have been cleaned by this type of abrasive will be exhibited by this company. A small sandblast machine will be shown in operation.

GREAT LAKES FOUNDRY SAND CO., Detroit—This company will display special molding, bank, silica and sandblast sands as well as fire clay and sand testing equipment.

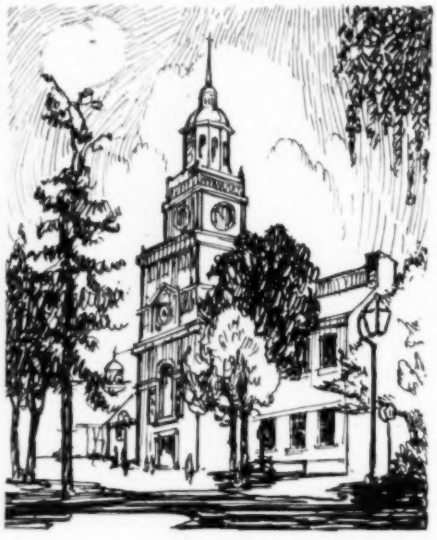
GREAT WESTERN MFG. CO., Leavenworth, Kans.—This company will show a gyratory laboratory sifter and a gyratory foundry riddle. A new riddle designed for large capacity will be shown for the first time. The exhibit will be in charge of Charles F. Murphy.

GRINDLE FUEL EQUIPMENT CO., Harvey, Ill.—A multi-stage pulverizer, an impact pulverizer with air separation, and a pulverized coal burner will feature this exhibit. The following representatives will be in attendance: W. R. Bean, D. J. Reese, J. E. Charles, C. R. Taylor and M. F. Becker.

H

HAYWARD CO., New York—This company will exhibit several types of buckets including an air operated orange peel bucket and an electric motor clam shell bucket. Models of the buckets also will be shown.

HERMAN PNEUMATIC MACHINE CO., Pittsburgh—This company will show a few of its smaller rapid production type jarr, roll-



over, and pattern draw machines and a new base type jarring machine. The company will be represented by Thomas Kaveny, A. G. Doyle, R. Harris, R. F. Ringle, I. J. Oesterling, T. H. Renkenberger, Thomas Kaveny Jr., Louis Plassmeyer, C. W. Miller, R. P. Morgan, C. S. McMath, W. W. Hughes, Robert M. Porteous, L. L. Johnston, Joseph Gibson, Clarence Shorts and Alfred Herman.

HILL & GRIFFITH CO., Cincinnati—The booth of this company will be fitted up as a rest room for the entertainment of visitors at the convention. Representatives in charge will be John Hill, Bruce Hill, Wm. Oberhelman, F. W. Weissmann, C. L. Gysin and Matt Geier.

HOLLEY CARBURETOR CO., Detroit—Several permanent mold machines will be shown in operation at the booths of this company.

HYNSON, WESTCOTT & DUNNING, Baltimore, Md.—This company will exhibit an antiseptic for first aid and dressing station use. W. Rodney Burton, Nathaniel Nicolai and L. C. Shepard will be in charge of the exhibit.

I

ILLINOIS CLAY PRODUCTS CO., Joliet, Ill.—Samples of products including various preparations of fire clay, furnace cement and fire clay flour will be exhibited by this company. The exhibit will be in charge of O. L. Jones and A. S. Nichols.

INDEPENDENT PNEUMATIC TOOL CO., Chicago—A line of chipping and riveting hammers, air hoists, grinders, sand rammers, electric nut and screw drivers and tappers, and moisture separators will be shown by this company. A new rotary type grinder and sander also will be shown. The company will be represented by R. T. Scott, A. Anderson, A. L. Schuhl, H. F. White, H. F. Charbono, W. E. Dougherty, H. F. Nivison and J. A. Hill.

INDIANA CONSUMERS GAS & BY-PRODUCTS CO., Chicago—This company will exhibit samples of foundry coke and will be represented by Leon Stern, Lewis D. McClaren, Lloyd E. Davis and John F. Molony.

INDUSTRIAL MINERALS CO., Columbus, O.—Samples of foundry sands for gray iron, malleable, steel and brass castings will be shown by this company. Specimen castings made in these sands also will be on display. The representatives will be W. G. Edwards, Ed. R. Williams, R. W. McCandlish and H. N. Rose.

INGERSOLL-RAND CO., New York—Air compressors, pneumatic chipping hammers, pneumatic sand rammers, pneumatic hoists, pneumatic grinding machines, pneumatic riveting hammers and pneumatic drills will be exhibited by this company.

INTERNATIONAL MOLDING MACHINE CO., Chicago—This company will exhibit a variety of molding machines including jolt squeezers; post jolt squeezers; jolt, squeeze, strip machines; jolt, hand stripping machines; jolt, power stripping machines; jolt, power lifting machines; plain stripping machines, jolt ramming, power turn-over, power draw machines; and core turn-over, draw machines. The representatives will be as follows: Edward A. Pridmore, Harold E. Pridmore, Lawrence D. Pridmore, W. W. Miller, Carl Levahn, E. G. Borgnis, Hugh Gallagher, M. J. Monahan, W. J. Rowley, Luke S. Shannon and W. J. Briggs.

INTERNATIONAL NICKEL CO., New York—This exhibition will consist of industrial applications of nickel cast iron and other nickel alloys. Representatives in attendance will be as follows: F. S. Jordan, R. A. Wheeler, E. J. Bothwell, A. J. Wadhams, T. H. Wickenden, J. S. Vanick, F. B. Coyle, D. M. Houston, and T. J. Wood.

IRON TRADE REVIEW, Cleveland—The booth of this company will be fitted up as a rest room where those in attendance at the convention are invited to make their headquarters. The representatives will be E. L. Shaner, J. D. Pease, George O. Hays, L. C. Pelott, E. C. Kreutzberg, B. K. Price, Herbert R. Simonds, and W. T. McCall.

J

JEFFREY MFG. CO., Columbus, O.—A sand conditioning machine will be featured at the booth of this company. C. H. Trik will be in charge of the display.

JOHNSTON & JENNINGS CO., Cleveland—This company will show in operation a new type roll-over machine with air clamp and air equalizer. It also will display a new type jolt squeeze pattern draw machine, a jolt squeeze machine, a portable jolt squeeze machine, together with vibrators, hard iron stars and miscellaneous equipment. The company will be represented by J. L. Battenfeld.

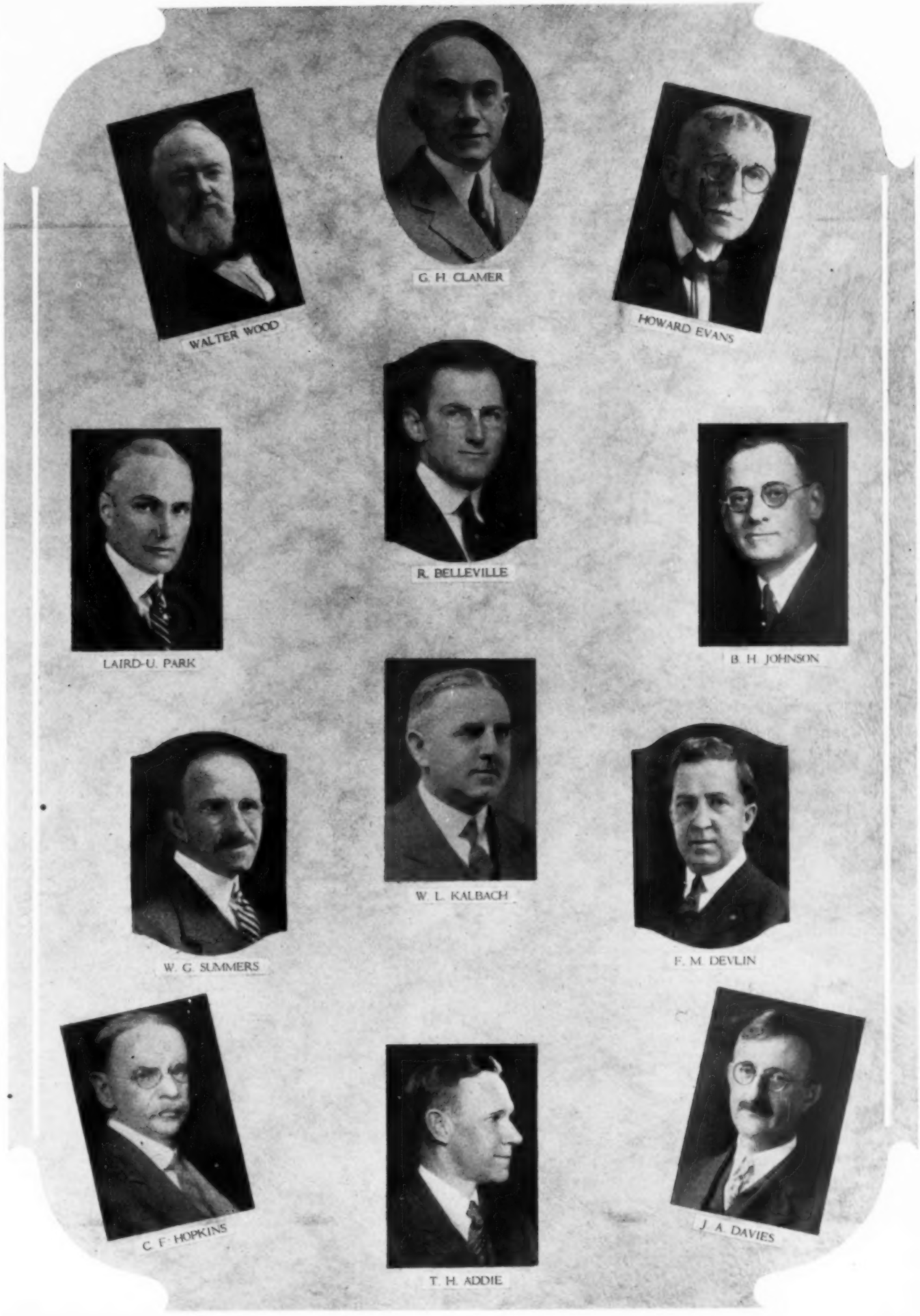
K

CHARLES C. KAWIN, Chicago—This booth will be fitted up as a rest room for the visitors at the convention.

KELLER MECHANICAL ENGINEERING CORP., Brooklyn, N. Y.—An automatic die and mold cutting machine and a line of flexible shaft grinders will be on display at the booth of this company. The representatives will be Henry Schreiber and Paul C. Renno.

SPENCER KELLOGG & SONS, INC., Buffalo—This company will have a large booth in which to entertain foundrymen and will display core oils and cores made with this core oil. The company will be represented by W. L. Goetz, V. A. Acer, E. G. Allen, E. J. Felt, D. J. Healy, E. A. Medbery, H. J. Strassberger, and J. N. Yaeger.

KEYSTONE COAL & COKE CO., Greens-


WALTER WOOD
G. H. CLAMER
HOWARD EVANS
R. BELLEVILLE
LAIRD-U. PARK
B. H. JOHNSON
W. L. KALBACH
W. G. SUMMERS
F. M. DEVLIN
C. F. HOPKINS
T. H. ADDIE
J. A. DAVIES

burg, Pa.—This company will exhibit samples of foundry coke.

KEYSTONE LUBRICATING CO., Philadelphia—Several types of foundry equipment fitted with lubricating systems manufactured by this company will be on display. Various types of lubricants also will be shown. The company will be represented by H. A. Buzby, G. W. Hall, T. B. Little, J. R. Lawrence, C. T. Moyer and F. D. Street.

KLING BROS. ENGINEERING WORKS, Chicago—A new high speed, double end, heavy duty grinder, designed for speeds up to 8500 revolutions per minute will be shown by this company. The exhibit will be in charge of P. E. Kling and H. J. Aagaard.

KNEFLER-BATES MFG. CO., Indianapolis—Core binders, facing flour and specimens of cores will be shown by this company. Representatives will be Ernest Knefler, Geo. B. Hill, John A. Green, and Herbert J. Bever.

H. W. KNIGHT & SON, Seneca Falls, N. Y.—White metal and brass pattern letters and figures and foundry trade-marks will be featured at the booth of this company. The display will be in charge of H. D. Knight.

H. KRAMER & CO., Chicago—Brass and bronze ingots and castings made from these metals will be shown by this company. I. Kaden, L. Chapman, S. M. Marks, Wm. Romanoff and Geo. H. Grone will be in attendance.

L

WM. LAIDLOW, INC., Belmont, N. Y.—Metal cutting band saws will be featured at the booth of this company.

LANCASTER SAND & COAL CO., Lancaster, Pa.—This company will exhibit its line of foundry sands.

H. M. LANE CO., Detroit—Photographs and drawings of the work done by this company will be shown. The exhibit will be in charge of H. M. Lane.

LAVA CRUCIBLE CO. OF PITTSBURGH, Pittsburgh—This company will exhibit a complete line of pit type and tilting type graphite crucibles for use in nonferrous melting plants. In addition crucible covers, crucible funnels, phosphorizers, sleeves, burner nozzles, skimmers and stirrers will be shown.

LEEDS & NORTHRUP CO., Philadelphia—Potentiometer pyrometers for automatic control, for automatic recording and control, and for automatic recording only, will be shown by this company. Optical and portable instruments also will be exhibited. The display will be in charge of Henry Brewer, E. B. Estabrook, Oscar Brewer and E. C. Wood.

LEHIGH SAFETY SHOE CO., Allentown, Pa.—This company will exhibit a line of shoes for foundry use. The display will be in charge of C. H. Clauser and J. T. Clauser.

LINDE AIR PRODUCTS CO., New York—This company will display a complete line of oxy-acetylene welding equipment and supplies, together with an assortment of articles fabricated by the welding process. A new type of blow pipe for foundry use also will be shown. The following will be in attendance at the booth: E. B. Farwell, R. W. Boggs, H. E. Mittenmyer, P. A. L. Maurhoff, L. F. Rodgers and W. E. Mittenmyer.

LINDSAY-MCMILLAN CO., Milwaukee—Core oils and compounds, cutting oils and compounds and cores will be exhibited in charge of W. R. Pate, J. A. Gitzen, M. A. Pollard and A. E. Welch.

LINK-BELT CO., Chicago—An operating mold conveyor, speed reducers, belt conveyor idlers, vibrating shakeout riddle, elevating machinery and drive chain will be exhibited by this company. Photographs of installations also will be shown. The representatives in attendance will be: J. J. Hartley, E. L. Berry, George O'Connor, R. J. Heisserman, H. L. Strube, Norman Smith, W. C. Carter, G. L. Morehead, A. H. Moore and M. Tholen.

LOUDEN MACHINERY CO., Fairfield, Ia.—Monorail systems, electric hoists, electric ladle pouring devices and cranes will feature the exhibit of this company. Representatives will be R. B. Louden, R. Bruce Louden, Roy Louden, L. F. Berthold, P. M. Hassler, H. L. Stetser, P. L. McCain, E. H. Seelbach, W. H. Eldridge and Philip Kinzel.

LOWE MFG. CO., Detroit—Electric sifting machines, equipped with pyramid riddles and riddle bottoms will be shown in operation at the booth of this company. R. G. Lowe, J. W. Somers and J. C. Somers will be in charge of the exhibit.

DAVID LUPTON'S SONS CO., Philadelphia—This company will exhibit steel window

products including continuous windows, an operating device, pivoted windows, skylights and roof designs. Photographs of installations throughout the country will be projected on the screen. The representatives who will attend are as follows: Clarke P. Pond, Geo. N. Hingston and J. W. Kauffman.

M

J. S. McCORMICK CO., Pittsburgh—This exhibit will consist of a new core pasting machine for automatically spreading paste on split cores, a new mixing machine for mixing blacking, facing, core paste and other foundry materials; a sand mixer for core and facing sand; and a complete line of foundry facings and supplies. The following will be in attendance: J. S. McCormick, H. T. Herr Jr., F. J. Buerger, H. D. Fowler Jr., Harry J. Winters, C. C. Bumbaugh and James W. Early.

R. W. McILVAINE CO., Chicago—Photographs showing sand and mold handling systems, and cupola charging apparatus will be on display at this booth. In addition the company will show its portable instrument for determining the moisture in molding sands and the mill type meter which indicates the condition of sands in the mill. Representatives will be R. W. McIlvaine, R. L. McIlvaine and Paul Ackerman.

MACLEOD CO., Cincinnati—This company will display several types of sandblast machines, paint sprayers, blacking sprayers, and oil burners. Photographs of numerous installations of equipment made by the company also will be shown. The exhibit will be in charge of Walter Macleod and James Lauder.

PAUL MAEHLER CO., Chicago—A rack type core oven in operation with gas heater and temperature control equipment, heaters, and blowers will be shown by this company. The representatives will be A. E. Maehler, R. C. Schwarz, H. R. Fox and H. M. White.

MALLEABLE IRON FITTINGS CO., Branford, Conn.—This company will exhibit flask rappers, pot rappers, long stroke vibrators, as well as regular and special vibrators and foundry accessories. The company will be represented by George B. Pickop, T. F. Hammer, Lincoln Fitzpatrick, George Agnew, Oscar Montelius and Raymond Wright.

MANHATTAN RUBBER MFG. CO., Passaic, N. J.—This display will consist of a heavy duty grinder stand and a large swing frame grinder equipped with rubber bonded wheels. These machines will be shown in operation grinding steel castings. The exhibit will be in charge of W. H. Steinberg and W. F. Bechtel.

MARSCHKE MFG. Co., Indianapolis—A complete line of light and heavy duty pedestal grinders, heavy duty floor grinders, buffers, combination grinders and buffers, snaggers, swing frame grinders, etc., will be on display at the booth of this company. Representatives will be W. A. Marschke, W. T. Johnston, J. A. Fairfield and Luke M. Boyd.

MATHEWS CONVEYER CO., Ellwood City, Pa.—A conveyor loop approximately 20 feet long and 10 feet wide, made up of heavy duty foundry roller conveyor with a power booster for regrading the roller conveyor line will be shown at the booth of this company. This loop will be used to handle various sizes, weights and styles of castings, molds, etc. The display will be in charge of J. H. Hough.

MATHIESON ALKALI WORKS, INC., New York—The exhibit of this company will consist of a display of castings illustrating the developments in the refining and desulphurizing of cast iron with a cupola flux of its manufacture. The representatives will be G. S. Evans, J. R. Schmertz and W. D. Marshall.

MERCURY MFG. CO., Chicago—A line of industrial trucks will be featured by this company.

METAL & THERMIT CORP., New York—Special metals and alloys and welding compounds will be exhibited by this company. Arthur Braid will be in charge of the display.

H. E. MILLS MFG. CO., Syracuse, N. Y.—Dry core compounds and facings will be shown at the booth of this company by J. R. Webster.

MILWAUKEE FOUNDRY EQUIPMENT CO., Milwaukee—This company will show motion pictures of molding equipment in operation in various foundries. The representatives in attendance will be E. J. Byerlein, H. E. Fellows, L. E. Gregory, C. F. Jurack, J. E. Lambrix, T. J. Magnuson, J. H. Morton and M. F. Byrne.

MONARCH ENGINEERING & MFG. CO., Baltimore—This company will show a variety of melting furnaces either with or without crucibles and using oil, gas, coal or coke as fuel. Other equipment shown will include core ovens, a melting furnace without crucibles which operates automatically, a line of heat treating furnaces, and a special soft metal aluminum furnace. The representatives will be James V. Martin, William H. Raber, William Chenowith and H. D. Harvey.

MT. JEWETT FIRE CLAY CO., Mt. Jewett, Pa.—Blended fire clay for bonding iron foundry and steel foundry molding sands, ground fire clay for general use in foundries, and a refractory cement will be exhibited at the booth in charge of Edward M. O'Neill and A. F. Shaffer.

N

NATIONAL ENGINEERING CO., Chicago—This company will show a sand mixer equipped with a speed reducer, motor base and couplings. This machine will be operated empty. The company also will show a 3-foot diameter

J. D. MILLER
W. J. RICE
E. S. SPARKS
A. P. LEE
PARKER SMITH
W. B. COLEMAN
H. L. HENSZEY
P. R. RAMP
R. T. COVINGTON
J. A. MARTIN
J. H. SHEELER
J. A. STRECKER

pan mixer, with motor and worm gear reducer, to illustrate the blending action of the muller type mixer; sections of conveying equipment and photographs and layouts of sand handling and preparing equipment for various classes of foundries. The company will be represented by H. S. Simpson, A. G. J. Rapp, Barney Castor, W. A. Kellogg, H. N. Schreuder, W. C. Edgar and C. D. Hollins.

NATIONAL PULVERIZING CO., Milwaukee, N. J.—This display will consist of sandblast, dry sands and ground silica or mold wash. The company will be represented by Wilbert Bivins, A. S. Carman, and F. M. Wheat.

NATIONAL SMELTING CO., Cleveland—This company will display aluminum ingot metals.

NEW HAVEN SAND BLAST CO., New Haven, Conn.—This company will exhibit a radial and three sizes of direct pressure sand blast barrels, a roller bearing tumbling mill, a side draft sandblast room, a flat bag dust arrestor and a small unit dust arrestor for grinding equipment. The company representatives will be T. Hemmer, D. S. Sammis, S. S. Parsons, C. E. Billings, G. F. Fatscher, J. R. Wisely, L. Thompson, W. Mattison, F. C. Morey and G. Walzer.

NEW JERSEY SILICA SAND CO., Millville, N. J.—Samples of various grades of molding sand, core sand, silica flour, special steel foundry blended sand, sandblast sands and dry sands will be shown by this company. The exhibit will be in charge of Burdette Tomlin, Clarence R. Wolf, and Jack Hallard.

NIAGARA FALLS SMELTING & REFINING CORP., Buffalo—This company will exhibit alloys of its manufacture as well as castings made from these alloys. The representatives will be Ernest G. Jarvis, Raymond Hunter, George G. Michie and Samuel Frankel.

WM. H. NICHOLLS CO. INC., Brooklyn, N. Y.—A variety of molding machines of numerous types will be on display at the booth of this company. The representatives will be William H. Nicholls, F. W. Dixon, G. Anderson and L. R. Schocken.

NORTHERN ENGINEERING WORKS, Detroit—Crane trolleys and an electric lift hoist will be featured at the booth of this company. The representatives will be as follows: H. W. Standart and H. C. Rood.

NORTON CO., Worcester, Mass.—Special grinding wheels, refractory ware, grinding machines and special floors will be exhibited by this company. The following will represent the company: Herbert Duckworth, R. M. Johnson, Paul Hoffman, J. D. Laughrey, W. J. Bell, E. F. Anderson and H. S. Bowler.

O

OBERMAYER CO., Chicago—A line of foundry supplies will be exhibited by this company. The display will be in charge of S. T. Johnston.

OILESS CORE BINDER CO., Cleveland—A core binder, a core-mold wash and a core paste will be shown by this company as well as cores, dry sand molds and castings which have been made with these products. J. H. Bruce, J. A. Hamilton, H. A. Baker and H. B. Fischer will represent the company.

OLIVER MACHINERY CO., Grand Rapids, Mich.—An extensive line of woodworking machinery will be shown in operation at the booth of this company. The following representatives will be in attendance: A. S. Kurkjian, Arthur Blake, Charles A. Ginter, J. R. Duthie, J. E. McLauchlen and C. R. Crossley.

TINIUS OLSEN TESTING MACHINE CO., Philadelphia—A transverse testing machine, a hardness tester with attachments, a brinell hardness tester, an automatic testing machine for cores and various recording instruments will be featured by this company. The booth will be in charge of T. Y. Olsen, R. B. Lewis, Jacob Lundgren and B. L. Lewis.

OSBORN MFG. CO., Cleveland—Molding machines, sand treating equipment, sand and mold-handling equipment will be shown in operation at the booth of this company. Large molds will be made and a squeezer machine operated on the production line making molds continuously. Many improvements in sand treating and sand and mold handling equipment will be shown. Several other machines from the line manufactured by this company also will be exhibited together with patterns and flasks. The company will be represented by F. G. Smith, H. R. Atwater, E. S. Carman, M. W. Zeman, E. T. Doddridge, J. C. Alberts, F. T. Spikerman, R. E. Kiefer, H. B. Klar,

G. G. Adam, R. C. Miller, R. W. Hisey, P. F. Smith, J. D. Wise, and R. E. Lincoln.

OTTAWA SILICA CO., Ottawa, Ill.—Sandblast sands, steel molding sand and silica flour will be featured at the booth of this company.

A. T. OTTO & SONS, New York—This company will display its line of antifriction bearings.

P

PANGBORN CORP., Hagerstown, Md.—This company will have a large exhibit of sandblast room, barrel and table equipment, dust arresters and protective clothing for the operator. Sandblast abrasives and supplies also will be displayed. The company exhibit will be in charge of Thomas W. Pangborn, John C. Pangborn, H. D. Gates, W. C. Lytle, J. J. Carr, C. T. Bird, L. W. Wagner, William T. Randall, Fred E. Wolf, Jesse J. Bowen, E. C. Gilmore, George A. Cooley, B. R. Artz, L. L. Stouffer, M. I. Dorfin, P. J. Potter, Foster J. Hull, William A. Rosenberger and E. J. Dunbeck.

PATENT CEREALS CO., Geneva, N. Y.—Core and facing binders will be on display and cores, samples of core mixtures, pictures of large castings made with this binder, etc., will be shown. The display will be in charge of A. N. Duncan, and T. K. Fahy.

PAXSON-TAGGART, INC., Philadelphia—Samples of various grades of foundry sands, gravels and clays, as well as other foundry supplies will be exhibited by this company. A motion picture also will be shown to illustrate the methods of producing foundry sands, gravels and clays. The representatives will be G. P. Albrecht and M. R. Taggart.

PENNSYLVANIA FOUNDRY SUPPLY CO., Philadelphia—This company will demonstrate a new type of flask equipment, a core and facing binder, a line of foundry chaplets, facings, core oils and special parting compound, various grades of molding sands and core and silica sands. A new pattern compound and a special blacking also will be demonstrated as well as other foundry supplies. The representatives will be Spencer H. Werner, Daniel Farris, Guy E. Lund, Charles Quast, L. S. Smith, John Morris, Albert L. Whitaker, John W. Brown, J. C. Alpeters, Herbert H. Klein, Harry W. Brown, C. Horace Palmer, Herman E. Mandel, Stanley B. Wentz and Millard F. Carr.

PENTON PUBLISHING CO., Cleveland—The booth of this company will be fitted up as a rest room where those in attendance at the convention are invited to make their headquarters. The representatives will be John A. Penton, H. Cole Estep, J. D. Pease, F. C. Cole, E. L. Shaner, Dan M. Avey, Pat Dwyer, Frank G. Steinebach, Charles Vickers, Edwin Bremer, E. C. Kreutzberg, Herbert R. Simonds, B. K. Price, G. B. Howarth, J. H. Ahrens, George O. Hays, L. C. Pelott and W. T. McCall.

CHARLES PETTINOS, New York—Various kinds of molding sand, core sands, etc., as well as plumbago, various foundry facings, core blacking, dry sand blacking and ingot mold blacking will be featured at the booth of this company. The representatives will be Charles Pettinos, W. T. Bennett, J. Howard Bing, Marshall M. Houskeeper, Walter H. Laros, Walter J. Meighan and Martin Meiss.

GEORGE F. PETTINOS, Philadelphia—This company will exhibit its line of foundry sands and facings. The exhibit will be in charge of George F. Pettinos.

PITTSBURGH ELECTRIC FURNACE CORP., Pittsburgh—This company will exhibit one 125-pound an hour electric furnace in operation melting gray iron. The molten iron will be poured in a permanent mold exhibited by the Holley Carburetor Co., Detroit, producing souvenirs for convention visitors. The Pittsburgh Electric Furnace Corp. will be represented by W. B. Wallis, W. E. Lewis, R. D. Thomas, Alexander Haigh, Presley Hamilton, W. H. Payne, and W. L. Kammerer.

PORT CRESCENT SAND & FUEL CO., Port Crescent, Mich.—Samples of foundry sands will be shown by this company under the direction of George Scott, N. P. Dessert, W. I. Sallee, A. N. Farmer and M. P. Drennan.

PORTAGE SILICA CO., Youngstown, O.—Samples of steel molding, core and sandblast sands and samples of silica rock in its natural state will be shown by this company. E. E. Klooz, C. F. Eberhart, and Lee R. Farrell will be in charge of the exhibit.

PRECISION GRINDING WHEEL CO, INC., Philadelphia—Various types of grinding wheels, from the roughest type snagging wheel to the fine precision wheels, will be shown by this company, as well as samples of work done on these machines. Floyd W. Anderson will be in charge of the exhibit.

PRODUCTION EQUIPMENT CO., Cleveland—This company will exhibit a line of sand preparing equipment.

PULMOSAN SAFETY EQUIPMENT CORP., Brooklyn, N. Y.—Safety equipment for foundry workers will be featured in the display of this company.

PYROMETER INSTRUMENT CO., New York—This company will exhibit an optical pyrometer designed to determine the temperature of small glowing bodies or of pouring metal. An insertion pyrometer for determining the temperature of molten nonferrous metals also will be shown.

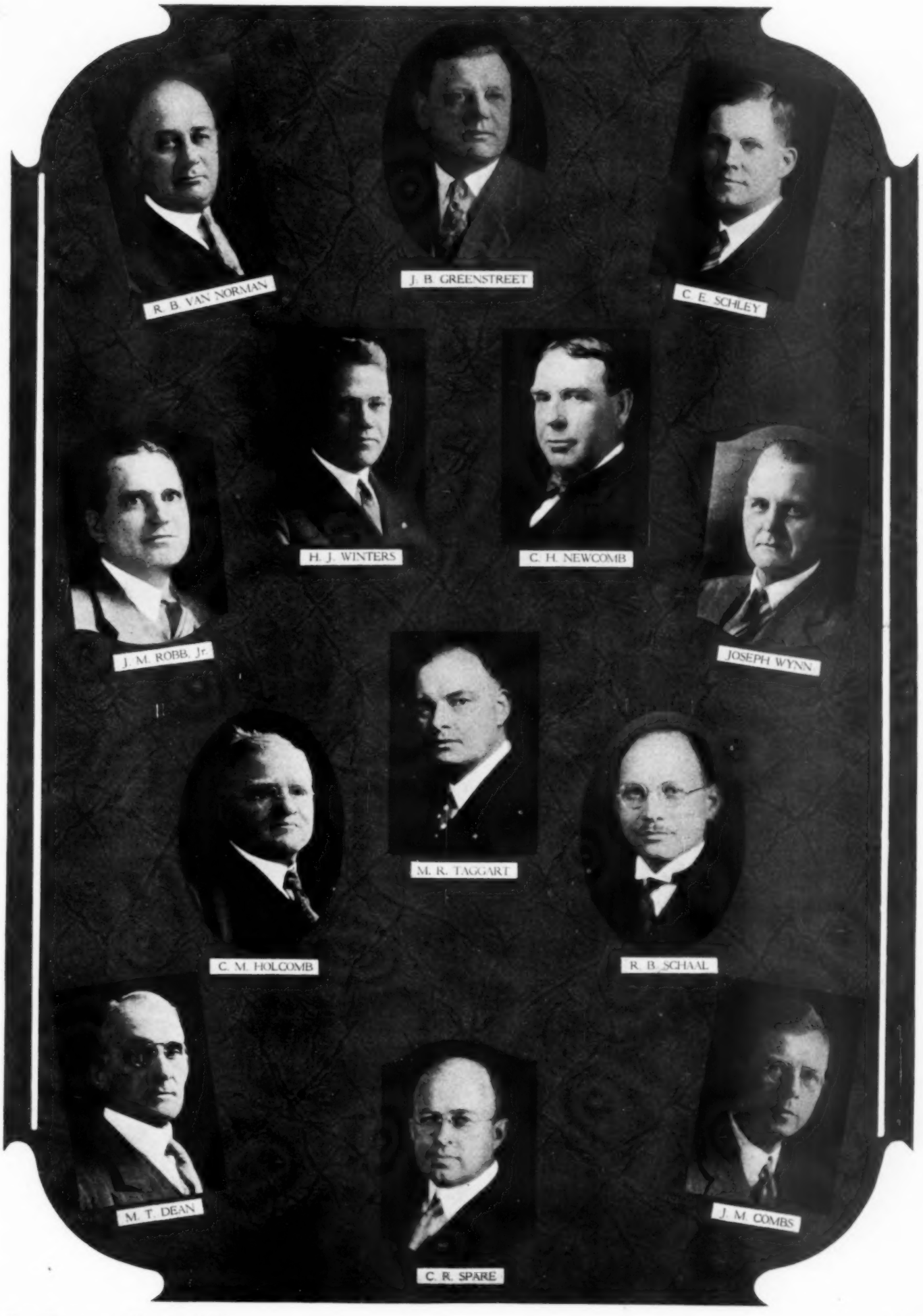
R

READING CHAIN & BLOCK CORP., Reading, Pa.—This company will exhibit its line of cranes, electric hoists, chain blocks.

ROBESON PROCESS CO., New York—Core binders manufactured by this company and cores made from this type of binder will be shown. Gordon I. Lindsay, B. W. Bullen, T. J. Ryan, T. J. O'Hara, J. A. Smith and H. J. Leggett will be in charge of the exhibit.

WM. C. ROBINSON & SON CO., Baltimore—Samples of its line of core oils will be featured at the booth of this company.

ROGERS BROWN & CROCKER BROS., INC.,


R. B. VAN NORMAN
J. B. GREENSTREET
C. E. SCHLEY
H. J. WINTERS
C. H. NEWCOMB
J. M. ROBB, Jr.
JOSEPH WYNN
M. R. TAGGART
C. M. HOLCOMB
R. B. SCHAAL
M. T. DEAN
C. R. SPARE
J. M. COMBS

New York—Samples of pig iron, coke, ferromanganese, ferrosilicon, molding sands, aluminum, etc., will be shown by this company.

ROHRBACHER SHOE CO., Boston—Special shoes for foundry workers will be exhibited by this company.

ROTOR AIR TOOL CO., Cleveland—A complete line of pneumatic tools including portable grinders and drills will be exhibited by this company. A special feature of the display will be a high production grinder especially designed for the use of rubber or bakelite bonded wheels. Buffing wheels also will be shown. The representatives will be H. P. Bailey, K. L. Pohlman, F. R. Moore, G. O. Singer and L. K. Berry.

ROYER FOUNDRY & MACHINE CO., Wilkes-Barre, Pa.—Various models of a sand separator and blender will be shown at the booth of this company. G. F. Royer will be in charge.

RUEMELIN MFG. CO., Minneapolis—A sandblast tilting tumbling barrel for cleaning small works, a sandblast cabinet, sandblast gun, sandblast generator and a sandblast curtain will be featured by this company. Representatives will be Richard Ruemelin and Harold A. Flitz.

S

SAFETY EQUIPMENT SERVICE CO., Cleveland—Safety equipment for the foundry worker such as clothing, goggles, etc., will be shown by this company.

SAGER GLOVE CORP., Chicago—A line of gloves suitable for use in the foundry will be shown by this company.

SEMET-SOLVAY CO., New York—Samples of foundry coke will be shown by this company. The representatives will be as follows: E. J. Burnes, D. S. MacEachern, D. H. Putnam, E. J. Rowe, W. S. Shelow, R. H. Watson, Samuel Weiss, J. M. Woods, and A. F. Stengel.

SHEPARD ELECTRIC CRANE & HOIST CO., Montour Falls, N. Y.—A cupola charging hoist, an umbrella type charging bucket, a special hoist of close clearance design and photographs of equipment in service will feature the display of this company.

SIMONS PAINT SPRAY BRUSH CO., Dayton, O.—This company will exhibit an air brush for spraying paint and other liquids as well as a portable air compressor for supplying the necessary air to operate the brush. The exhibit will be in charge of George W. Simons.

W. W. SLY MFG. CO., Cleveland—A sandblast room, a positive pressure rotary table, tilted sandblast mills, tumbling mills, dust arrester equipment and sand reclaiming equipment will be featured at the booth of this company. The following representatives of the company will be in attendance: S. C. Vessy, George A. Boesger, F. A. Ebeling, L. B. Brewster, C. P. Guion, M. T. Mortensen, D. L. Harris, W. L. Kammerer and R. W. Hasselle.

SMITH-MONROE CO., South Bend, Ind.—This company will exhibit a compressed air separator which is used to remove oil and water in compressed air lines. A separator of this type will be in operation separating the moisture which has been injected to an air line at 90 pounds pressure. The separated oil and water will be discharged automatically from the separator by a small trap which also is made by this company. The display will be in charge of A. F. Squier.

SMITH OIL & REFINING CO., Rockford, Ill.—Core oils and liquid rosin oils as well as cores made from these products will be on display at the booth of this company. The representatives will be F. C. Maley, A. A. Abramson, Omer Smith and Stanton Smith.

WERNER G. SMITH CO., Cleveland—Samples of core oils and specimens of cores made with these oils will be shown by this company. The representatives will be Werner G. Smith, N. A. Boyle, Milton S. Finley, Frank H. Dodge, F. S. Havens, George H. Graham, I. M. Gertels, L. P. Robinson, L. F. Ferster, Wallace Alexander, William Rayel, Thomas Procter, M. M. Werckman, John M. Glass and A. S. Coulter.

SPENCER TURBINE CO., Hartford, Conn.—Turbine compressors for supplying air for foundry cupolas, oil and gas burners for core ovens and other industrial heating equipment will be featured at the booth of this company. The machines shown will include one 20-horsepower, one-pound machine and a 5-horsepower, one and one-half pound machine. The representatives will be S. E. Phillips, F. A. Wright and O. J. Dingee.

SPRINGFIELD FACING CO., Springfield, Mass.—This company will exhibit its line of foundry facings and supplies and will be represented by L. S. Brown, H. E. Beckman, H. Z. Dingee, H. E. Hamlen, Frank Kumer, William Lawson and Florence Bullion.

STANDARD SAND & MACHINE CO., Cleveland—A new type of core and facing sand mixer, which is equipped with motor and speed reducer drive, roller bearings and a hexagonal screen, will be shown by this company. Harry E. Boughton will be in charge.

STANDARD SILICA CO., Chicago—This company will show samples of its line of core sand, sandblast sand, steel molding sand, silica flour and silica wash.

STERLING WHEELBARROW CO., Milwaukee—This display will consist of foundry flasks, trucks, shop boxes, wheelbarrows, casters, wheels and other foundry specialties. The company also will exhibit a number of flasks taken from the regular production orders in process at the plant. A number of photographs of various foundries in the United States also will be displayed to show the flasks made by this company in use on both special and production work. The exhibit will be in charge of H. H. Baker, R. F. Jordan, G. H. Lambkin, J. M. Dickson, H. J. Felsburg, L. P. Robinson, J. A. Patterson, J. J. Coyne, and O. E. Steep.

FREDERIC B. STEVENS, INC., Detroit—This company will display a general line of foundry equipment, facings and supplies. A working exhibit of an automatic plating machine also will be featured. Frederic B. Stevens, W. H. Jos. Cluff, John M. Mayers and Lewis H. Kirby will be in charge of the display.

STONEY FOUNDRY ENGINEERING & EQUIPMENT CO., Cleveland—A complete shakeout bail, vibrators, a large core knockout machine, a new bench type knockout machine, a core grinding machine, and a line of ladles, hose clamps and fittings will be shown by this company. The representatives will be E. S. Cohen, G. A. Scott, and L. J. Reinhard.

SUGAR PINE EXHIBIT—Pattern lumber will be shown at this exhibit under the auspices of the Madera Sugar Pine Co., Pickering Lumber Co., Charles Nelson Co., Red River Lumber Co., Michigan California Lumber Co., Sugar Pine Lumber Co., and the California Door Co.

SULLIVAN MACHINERY CO., Chicago—The exhibit of this company will consist of an angle compound compressor operated by a direct connected electric motor, a vertical compressor also driven by a direct connected motor and a straight line, single stage, horizontal type compressor. The angle compound compressor will be operated to supply compressed air for other exhibitors. The company also will show a compressed air hoist, and electric double drum portable hoist. The exhibit will be in charge of Howard C. Sargent and E. F. Pie.

SUPERIOR SIZING CO., INC., Lockport, N. Y.—Foundry core oils and partings will be exhibited at this booth in charge of R. M. Snell, E. J. Johnstone, C. E. Schaad, H. Knight, F. A. Roehlk, J. E. Kershaw and J. M. Remmes.

SWAN-FINCH OIL CORP., New York—This company will exhibit its line of core oils. The display will be in charge of John J. Purvis, Nelson V. Joyce, H. F. Moncrieff, J. W. Closterman, Jesse Jones, T. L. Brennan and G. S. Robinson.

SWARTWOUT CO., Cleveland—Core ovens and drawer type ovens as well as a miscellaneous line of equipment will be shown by this company. The representatives will be C. F. Mayer, C. J. Pimsner and H. A. Bogardus.

T

TABOR MFG. CO., Philadelphia—This company will exhibit a complete line of foundry molding machines, including several new types which previously have not been shown. The representatives in attendance will be as follows: Wilfred Lewis, F. R. Wallace, Robert M. Maull, J. T. Ramsden, R. H. Wiehsner, P. J. Shire, James H. Coleman, H. W. Impey, William E. Sewell, John Pfendner, T. L. Sumner, John A. Rathbone and E. A. Platt.

TIONA PETROLEUM CO., Philadelphia—A line of core oils will feature the display of this company.

TITGEN-EASTWOOD CO., Philadelphia—This company will display a cupola and a line of sandblast equipment. A. B. Eastwood, Christian Gunther, William Dunbar and Harry W. Titgen will represent the company.

TOTTENVILLE COPPER CO., Tottenville, N. Y.—This company will exhibit copper in ingot form.

TRUSCON STEEL CO., Youngstown, O.—A line of foundry flasks, gaggers, flat bands, pouring jackets, bottom boards, core plates, core racks, steel boxes and platforms will be shown at this booth. Information on industrial buildings also will be available. The representatives will be N. C. Ferreri, G. E. Madden, A. W. Ferguson, F. J. Vlaskamp and A. L. Abrahams.

TWENTIETH CENTURY SALES AGENCY, Philadelphia—A combination cross cut and rip saw machine which is equipped with dado head for grooving, a jointer, and sanding and boring attachments will be shown by this company. The display will be in charge of J. A. Drake and P. R. Ramsey.

W. S. TYLER CO., Cleveland—An electric screen suitable for screening and reclaiming foundry sand, a testing sieve shaker, standard screen scale testing sieves and samples of various types of wire cloth and screens suitable for foundry use, will be shown by this company. Individuals in attendance will be Neil E. Kile, D. V. Vigneron and M. D. Pugh.

U

UNITED COMPOUND CO., Buffalo—Vent wax of various sizes together with cores illustrating the use of this wax will be shown at the booth of this company.

UNITED STATES ELECTRICAL TOOL CO., Cincinnati—This company will exhibit its line of floor grinders, snagging grinders and portalbe grinders. This will include a multi-speed grinder designed to have the speed changes conform to the size of the wheel, a high frequency grinder and a disk sander. The company will be represented by C. G. Cresswell, W. B. DaSilva, H. N. Kelsey, W. R. Dorsey, M. A. Weidmayer and H. O. Coe.

UNITED STATES GRAPHITE CO., Saginaw, Mich.—A complete line of graphite plumbagos, core washes and other graphite products of interest to foundrymen will be on display at the booth of this company. The exhibit will be in charge of R. J. Edminston, J. J. Edminston, G. D. Robinson, R. A. Nauer and O. R. Miller.

VESUVIUS CRUCIBLE CO., Swissvale, Pa.—Various types of crucibles will feature the display of this company.

WADSWORTH CORE MACHINE & EQUIPMENT CO., Akron, O.—This company will show

(*Concluded on Page* 367)

Call Meeting of Gray Iron Interests

All Classes of Gray Iron Castings Producers Are Invited to Attend Conference Scheduled for Philadelphia, May 18, 1928

WHEN the session of the Gray Iron institute, scheduled for Friday morning, May 18, at 10 a. m. is called to order by B. H. Johnson, temporary chairman, a working plan for unifying the gray iron foundry interests of the country will be presented. As an outgrowth of the Pittsburgh conference, held at the Carnegie Institute of Technology, March 13, an organization committee of 15 has been busily engaged in studying the problems of the industry and methods for their solution.

The organization committee appointed at Pittsburgh includes the following gray iron foundrymen: Walter L. Seelbach, chairman, Forest City-Walworth Run Foundries Co., Cleveland; A. E. Hageboeck, vice chairman, Frank Foundries Corp., Moline, Ill.; J. H. Bruce, Bowler Foundry Co., Cleveland; J. L. Carter, Barlow Foundry Co., Newark, N. J.; H. S. Chafee, Builders' Iron Foundry, Providence, R. I.; A. E. Clarke, Des Plaines Foundry Co., Des Plaines, Ill.; J. D. Coltman, Bullard Machine Tool Co., Bridgeport, Conn.; Horace R. Culling, Carondelet Foundry Co., St. Louis; Fred Erb, Erb-Joyce Foundry Co., Detroit; W. J. Grede, Liberty Foundry Co., Milwaukee; John Hartman, Atlas Foundry & Machinery Co., Tacoma, Wash.; B. H. Johnson, Cresson-Morris Co., Philadelphia; Angus Macdonald, Snead & Co., Jersey City, N. J.; Don McDaniel, Hamilton Foundry & Machine Co., Hamilton, O.; and Edward B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.

All of these men are outstanding and representative gray iron foundrymen in the various parts of the country wherein their respective businesses are located. At a meeting of the committee held in Cleveland, Tuesday, April 10, thirteen of the number were present and these men with Arthur Tuscany, Phillip Frankel and Dan M. Avey, temporary secretary, devoted the entire day to consideration of the purposes and plans of organization for the Gray Iron institute.

Consideration was given to the form of organization of some 20 different trade associations, of which number five were selected as being similar in purpose and setup to the form of association needed in the gray iron field.

Gray Iron Institute States Purposes

THE purpose of this Institute shall be to promote the interests of the gray iron foundry industry by all lawful means such as—

Promotion of sound business ethics in the industry, based on honor and integrity in manufacturing and selling gray iron castings by its members.

Collection and distribution of information relative to the manufacture of gray iron castings.

To study new methods for merchandising gray iron castings, to strengthen present markets, to develop new markets and to discover new uses for gray iron castings.

Promotion of uniformity in methods of cost accounting.

Research work to further improve the quality of gray iron castings and to increase utilization in industry, co-operating with other research agencies toward that end.

Stimulation, by co-operative effort, of the use and sale of gray iron castings.

Establishment and maintenance of standards of quality for gray iron castings.

The foregoing clauses to be construed both as objects and powers; and it is hereby expressly provided that the foregoing enumeration of specific powers shall not be held to limit or restrict in any manner the powers of this corporation.

A detailed analysis was made of the financial plans of these organizations.

Early in the day, it was decided that the Gray Iron institute should stand upon its own base, without leaning upon any existing organizations in the foundry industry at present. The principles of enlightened selfishness were laid down as fundamentally essential in carrying out the work of the new institute. At the same time, the committee expressed itself as welcoming the co-operation of technical, business and trade associations on work which is tangent to the various organizations now active. Further, the active participation of the Gray Iron institute upon problems of a co-operative nature will be forthcoming under the plans as laid down by the organization committee.

Tentative drafts of constitution and by-laws are under preparation. These will be presented for consideration at the May 18 meeting in Philadelphia.

Free interchange of opinion upon these various undertakings and in fact an intensive study of the entire gray iron foundry problem will feature the meeting of the institute. Through courtesy of the American Foundrymen's association, the convention hall at the Philadelphia Commercial museum has been set aside for the meeting at 10 a. m., May 18. No conflicting sessions of the A. F. A. are scheduled for that date. All makers of gray iron castings, regardless of whether they are jobbing or manufacturing producers are urged to be present.

Charles F. Abbott, executive director, American Institute of Steel Construction, New York, will deliver the principal address at the May 18 meeting. Mr. Abbott's connection with the merchandising phases of the metalworking industries fits him admirably to give guidance to the Gray Iron institute at this period of its existence. He has been singularly successful in directing the group of steel fabricators, taking over this association work when the encroachment of rival materials was threatening.

Philadelphia Foundry

Alloys Gray Iron with Nickel

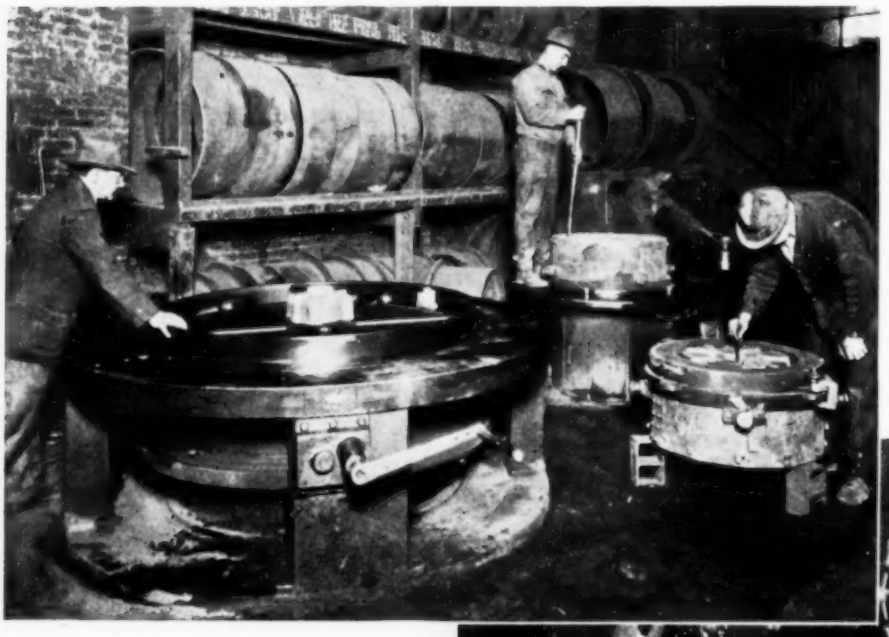
By E. J. Bothwell and Frank G. Steinebach

DEVELOPMENTS which have been made in iron and allied industries have governed to a large extent the progress of mankind. If it were possible to achieve the almost superhuman task of tracing the cause and effect of each period of history, it probably would be found that iron was the predominant factor in the life of practically every civilized age. The remarkable progress which has been made in every phase of American life may be attributed largely to the influence exerted by the various commercial forms of iron.

Pennsylvania, with its Valley Forge, its Gettysburg and its many other historically famous points, also was the center of the early iron industry of the country. Philadelphia, with its splendid facilities for shipping, soon became a distributing center for the Pennsylvania furnaces, and in time foundries, machine shops and other metalworking plants sprang up in the city. Many of these industrial establishments are in existence today, owned either by decendents of the founders, or combined with other companies. In numerous instances the control of a company has remained within one family for several generations. A brief sketch of the interesting and romantic events which have transpired in the two families represented in the Cresson-Morris Co., owner of one of Philadelphia's leading foundry and machine establishments is presented on page 349.

The Cresson-Morris company manufacturers a complete line of power transmission machinery including shafting and all of its appurtenances, friction clutches, pulleys and flexible couplings; rope transmission machinery; gearing for light or heavy service; sugar mill machinery; large presses; silk machinery; laundry equipment, and other types of high grade specialties.

It is altogether possible that the Cresson-Morris Co. will build a new plant in a different location in the not far distant future. When the present plant was constructed in 1888, at Eighteenth street and Allegheny avenue, that location was in the outskirts of the city. However, during



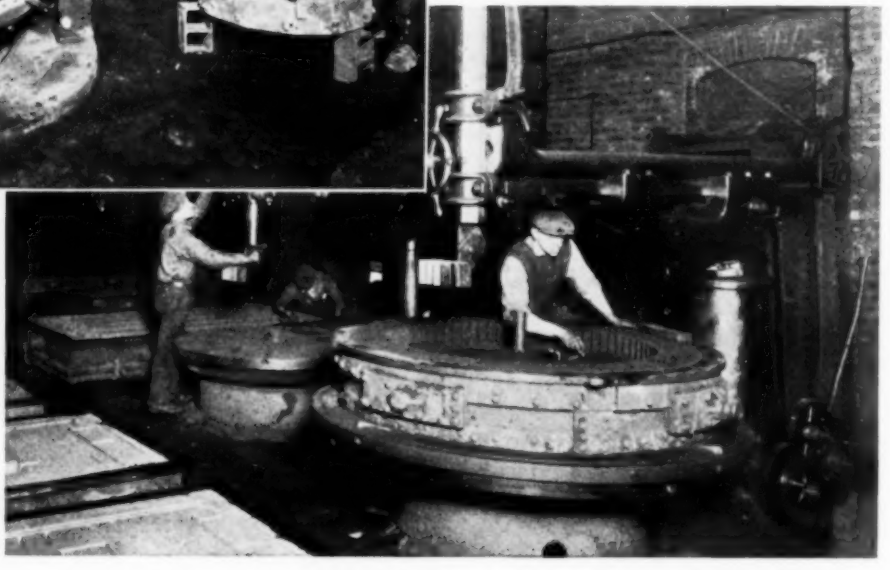


Fig. 1 (Above)—All Pulleys Up to 72 Inches in Diameter Are Made on Machines of this Type Fig. 2 (Below)—Various Sizes of Gears Are Made on Two Machines Located at One End of the Heavy Shop

Enterprising Gray Iron Foundry Located in the Convention City Produces a Variety of Heavy and Light Work from Iron Into Which a Small Amount of Nickel Has Been Introduced.

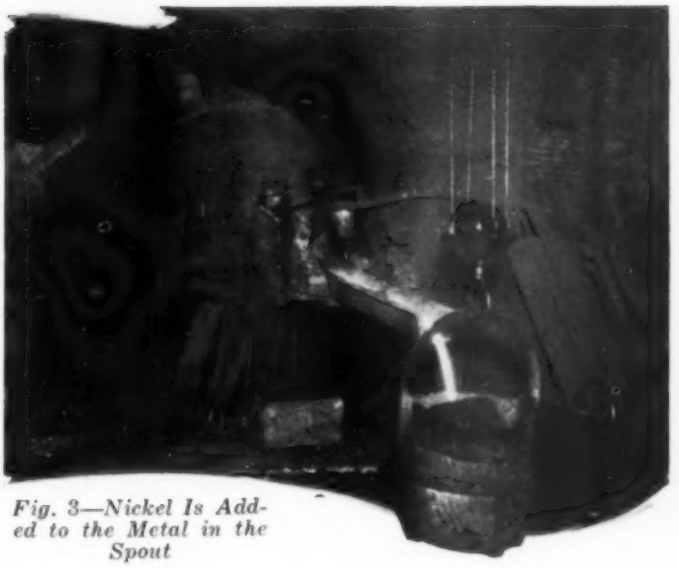


Fig. 3—Nickel Is Added to the Metal in the Spout

the years that have passed, Philadelphia has pushed out to the North far beyond the company's property and the plant today is located in a desirable residential section of the city. For that reason it has become almost mandatory for the company to dispose of the present property and build a new plant in a location where the property value is not so high. However, while a new plant probably would influence to some extent the practice followed at that foundry, it is probable that a portion of the work would be carried on in much the same manner as at present.

The foundry consists of two main buildings built in the form of an L. One building is used for the production of heavy work, large machinery castings, and all sizes of pulleys. The other houses the light casting shop, where the small castings are produced, chiefly on molding machines. The coreroom is located in a smaller building built near the intersection of the two main buildings and the cleaning department is located in a building at the side of the heavy shop. A small physical testing laboratory has been installed in the south end of the heavy shop and the company plans to equip and operate its own chemical and physical laboratory in the near future.

The building devoted to the production of the larger castings is 298 feet long and 55 feet wide. The floor is served by two overhead traveling cranes, one having a capacity of 25 tons and the other 5 tons. The floor is divided into three parts, chiefly by the type of work being done. Two gear machines, shown in Fig. 2, which may be used to make gears covering a wide range of sizes, are located near the south end of the building. A plain jolt table, made by the Tabor Mfg. Co., Philadelphia, is located a short distance beyond the gear machines and is used in molding frames for silk machines and other machinery castings of similar nature, where quantity is desired. A general idea of this type of work produced on the machine may be gained from the pile of frames for silk machines shown at the lower right in Fig. 6.

Since the silk machinery castings are produced in fairly large quantities, the capacity of the plain jolt machine would be exceeded if all of the various operations necessary to make the mold were preformed on the table. For that reason the molds are allowed to remain on the table of the jolt machine only long enough for the crew to perform the ramming and butting off operations. Several molders usually work on the floor in the immediate vicinity of the machine. These molders arrange the flask and patterns, fill the flask with the facing and backing sand and otherwise prepare the mold for the jolt machine. The entire assembly, ready for actual jolt-ramming then is swung into position where this operation is performed. It may be of interest to point out the methods of handling the work on the machine.

Flasks are placed on pattern boards located in the vicinity of the jolt machine. The necessary gaggers, gates and sprues are set in place in the cope. The bottom of the drag flask is barred and no bottom board is used, thus affecting a saving in the weight of materials which must be handled and also in the time required for the molding operation. The pattern board and pattern then are covered with facing sand, which is prepared in a muller type mixer, manufactured by the National Engineering Co., Chicago, and is distributed to the various molders in a bucket carried by the overhead crane. The flask is filled with sand, the flask and pattern board are clamped together and carried to the jolt table. After being jolted, the mold is butted off with pneumatic rammers.

Handle Molds with Crane

An interesting crane rigging is used to facilitate handling molds and flasks and drawing patterns. This rigging consists of a channel section, known as an equalizing bar. This bar is built with a heavy ring at its center, through which the crane hook passes. A stirrup, made of a circular steel bar, passes around the channel, one stirrup being located on each side of the ring. One end of a short chain is attached to the bottom of each stirrup and the opposite end to a small pulley. Each pulley in turn supports and endless chain about 18

Keeps First Casting

THE first casting poured in the new foundry of the Geo. V. Cresson Foundry & Machine Works, when the new plant was opened up at Eighteenth street and Allegheny avenue in 1888, *consisted of a cast iron plaque containing the following inscription:*

1859 1888
Geo. V. Cresson Foundry & Machine Works
18th and Allegheny, Philadelphia
Works Started Sept. 29, 1888
Antonio C. Pessano
Superintendent

This plaque now hangs in the plant of the Cresson-Morris Co.

feet long. When handling a mold, this chain passes around the trunnion on the flask, which prevents any friction between the chain and the trunnion and, therefore, makes it exceedingly easy to roll over the mold. The stirrups may be placed in any one of a number of grooves on the channel bar to provide proper adjustment for the various sizes of flasks handled and to distribute evenly the weight of the mold.

After the mold is rammed and struck off, the chains on the crane rigging are placed over the flask trunnions and the mold is drawn

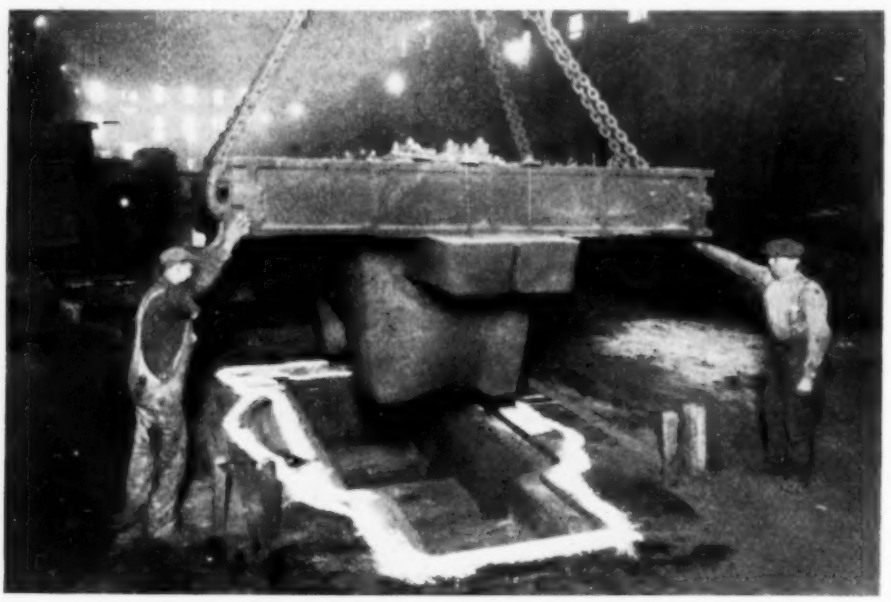


Fig. 4—A Variety of Large Castings Are Made in Pits

from the pattern. Two men balance the mold as it is drawn upward, and then roll it over. The mold then is finished, blacked and in the case of a drag, is placed on the floor. A new roll-over pattern draw molding machine, which operates in conjunction with the plain jolt machine, was being constructed in the foundry by the Tabor Mfg. Co., Philadelphia, at the time the material for this article was secured. This machine will facilitate the production of the type of work described and also will relieve the crane to a certain extent for other work in the shop.

The center section of the building is devoted to the production of large castings, either in pits or flasks as the occasion may require. Cast-iron plungers, frames for presses, molding machine bases, such as shown in Fig. 5, engine beds for dredging machines, expansion joints as shown in Fig. 8, and mixing chambers for silk plants, as shown in Fig. 7, are typical examples of the type of work made in that department. Pulleys of various sizes are made on special machines at the north end of the heavy shop and in a portion of the small shop. Examples of the series of machines, on which all sizes of pulleys from 16 to 90 inches may be made, are shown in Fig. 1.

Each of these machines will handle pulleys varying 12 inches in circumference. For example, pulleys ranging in size from 24 to 36 inches may be made on one machine simply by changing the various pieces which form the pattern. This type of machine makes pulleys up to 72 inches in diameter. As may be noted in Fig. 1, the machine consists of a heavy circular plate mounted at a convenient height on a frame. The plate has a circular section removed, this section being approximately 10 inches wide. The rim of the pulley is placed in this opening in the bed plate and ring sections are placed on either side of the flange pattern to fill entirely the opening in the bed. Of course it is necessary to have a flange pattern and the pair of circular plates for each diameter pattern and in addition each of the various types of flanges which are required necessitate an individual flange pattern. Some of the patterns for flanges are shown in Fig. 1.

The patterns for the pulley arms are laid in place on the bed plate and are held in place by dowels. Here again, it is necessary to have a different set of arm patterns for each size and often for each type of pulley. The hub pattern with the core print rests on the arm patterns, as may be noted in the illustration. The flange pattern is supported in such a way that it may be lowered flush with the bed plate or raised to the desired height, simply by turning the crank shown in the foreground of Fig. 1. Both the cope and the drag halves of the mold may be made on this machine.

The flange pattern is raised to a height equal to one half the width of the pulley flange to be made. The flask then is set in place on the plate bed, as may be noted in Fig. 1 on the second machine, and the mold is rammed up. The crank is turned stripping the flange pattern from the mold. The mold is lifted off, the patterns for the arms and the hub patterns are drawn and replaced on the plate bed and the same operations are repeated in making the cope. Similar equipment is employed in making worms of various sizes. The worm pattern is mounted on a table, similar to those on which the pulleys are made, and a special ring fits around the worm pattern, making a solid table. When the crank on the side of the table is turned, the worm turns either up or down. In making a mold the worm pattern is turned up as far as desired, the flask is set in place and the mold rammed up and then the worm pattern is turned down through the mold and into the base of the machine. This leaves a perfect impression of the worm pattern in the sand mold.

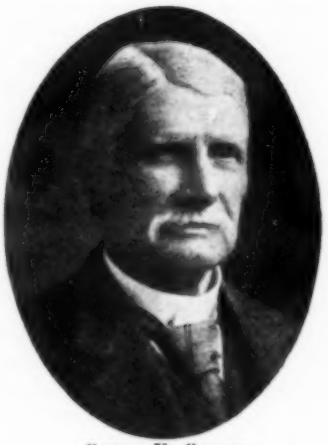
A variety of work is turned out in the light shop, including small parts for the different types of machines made by the Cresson-Morris Co., small pulleys, collars, couplings, hangers, brackets, etc. The greater portion of the molds for these castings are made in cast-iron flasks on jolt-squeeze molding machines made by the Tabor Mfg. Co. Hangers are made on two special plate machines, one equipped to strip the pattern from the mold and the other to raise the mold from the pattern. The small shop is equipped with monorail system which extends from the cupola to the opposite end of the building. Iron is taken from the cupola to the various molding floors in a ladle which is suspended from the carriage on the monorail track. One side of the shop has two pnuematic traveling hoists and one electric traveling hoist, the latter having been built by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. The light castings shop is 68 feet wide and 147 feet long.

Two cupolas are located at the intersection of the two foundry buildings. An interesting feature of the larger of the two cupolas is the fact that it has two spouts, one entering the

(*Continued on Page* 350)

ROMANCE OF IRON

Lures Generations *of* Pennsylvanians



George V. Cresson

Henry G. Morris

IN THE early days of Pennsylvania, many families first made a contact with the iron industry, and the record of progress of the ensuing decades is largely the record of their lives and the lives of their descendants. The family of Anthony Morris has been associated intimately with the Pennsylvania iron industry for over 200 years and his descendants now are connected with the Cresson-Morris Co. Anthony Morris ran a forge which was built by Thomas Rutter in 1720 at Manatawny Creek near Pottstown. This has been recognized by many authorities as the first successful iron works in Pennsylvania. Some years later, Colebrookdale furnace, the first blast furnace in the province, was erected by Thomas Rutter, James Lewis and Anthony Morris. This continued in blast until 1763.

Manatawny appears to have had a peculiar attraction for several early iron works. Perhaps some might facetiously suggest, it was because of the meaning of the name Manatawny was "the place where we drink." At any rate Anthony Morris and a Scotsman named McCall erected another forge there, about the year 1725, and two years later Morris and another group erected the famous Durham furnace. Iron making interests of Anthony Morris passed to his sons, Samuel, Joseph and John, who bought the Boiling Springs furnace in 1764 and engaged in the manufacture of blooms and stoves, fire backs and hollow ware. This company formed the nucleus of the famous Carlisle Ironworks.

During the next 100 years the connection of the Morris family in the iron industry was maintained. One branch of the family began the manufacture of sugar making machinery in 1828. In 1870, Henry G. Morris, a direct descendant of Anthony, purchased the Southwark Foundry, with the patents on the Weston centrifugals, from Merrick & Sons. Mr. Morris relinquished his interest in the Southwark Foundry in 1875, but continued to manufacture centrifugals under his own name. In 1890, Mr. Morris and his two sons, P. H. Morris and A. S. Morris, formed the Morris Engineering Co.

Remains of Ancient Blast Furnace

While not so closely allied with the development of the iron and steel industry in Pennsylvania, the forefathers of George V. Cresson, founder of the Cresson company, which now is a part of the Cresson-Morris Co., date back to Pierre Cresson, who emigrated from France in 1657.

Caleb Cresson, who was born in 1775 and whose father was a recorder for the Friends meetings in Philadelphia for over 20 years, was a merchant and philanthropist in Philadelphia. His son, William Penn Cresson, was born in Philadelphia in 1814. The early part of his life was spent in industrial pursuits and at one time he was a part owner of the Cresson-Stuart-Peterson Stove Foundry.

George V. Cresson, the son of William P. Cresson, was born in 1836. He learned the machinists trade with Bement & Dougherty and in 1859 organized a machine shop at Twelfth and Noble streets under the name of Cresson & Hubbard. Seven years later the plant was moved to the corner of Eighteenth and Hamilton streets and the name was changed to Cresson, Hubbard and Smith. Mr. Hubbard retired a year later and in 1870 the name was changed to the Philadelphia Shafting Works. Mr. Cresson then purchased the interests owned by Mr. Smith and in 1888 built a plant at the present location at Eighteenth and Allegheny.

Up to 1888, the company had operated a machine shop. However, when the plant was built in 1888, a large foundry was built for the production of gray iron castings. Geo. V. Cresson died in 1908 and the control of the plant passed to his three nephews. In 1912, the Morris Engineering Co. acquired a controlling interest in the George V. Cresson Co. and consolidated the two companies under the name of the Cresson-Morris Co. P. H. Morris is president, A. S. Morris is vice president, B. H. Johnson general manager and J. D. Miller general superintendent.

(*Continued from Page* 348)

heavy castings shop, as shown in Fig. 3, and the other delivering molten iron to a teapot ladle in the light castings shop. These spouts are built at approximately right angles to each other. The cupola bottom slopes from the back to a level portion between the two spouts. The daily melt is in the neighborhood of 25 tons. At least three different mixtures and often as high as five are made each day during the melting period. The special alloy mixtures usually are taken off first, then the metal for the machinery castings and last the iron for the light work. A detailed discussion of the alloys used by that company will be presented later. The large drying oven is used for both molds and cores. A door is provided in the large castings plant to load the molds and several doors open into the coreroom. Cores are dried on a rack car which has been designed to eliminate bearings at the wheels. Two angle irons extend across the bottom of each end of the car, at a predetermined distance apart. The bottom frame of the car rests on the wheel axle and when the car is moved either into or out of the oven, the car rolls on the axle from one angle iron to the other. This construction avoids all bearing trouble.

Fig. 5 (Above) — Heavy Molding Machine Cylinder Made of the Nickel Alloy

The castings are cleaned in a room built along one side of the large castings shop. This department contains a car type sandblast room built by the Pangborn Corp., Hagerstown, Md., a battery of grinders, and tumbling mills made by the Royersford Foundry & Machine Co., Royersford, Pa. Chipping is preformed with pneumatic chippers made by the Independent Pneumatic Tool Co., Chicago, and materials are handled by a hoist made by the American Engineering Co., Philadelphia. The cleaned castings pass directly from the cleaning department to the machine shop.

For many years the Cresson-Morris Co. has held a reputation for making castings of high quality. Like other foundries, in the period immediately following the war, it secured raw materials made under new high production methods which had a disturbing effect on foundry practice. This created a new set of conditions, which for a time, caused metal troubles that previously had not been encountered. However, foundrymen gradually have conquered these troubles and now are making better gray iron castings than ever were made before.

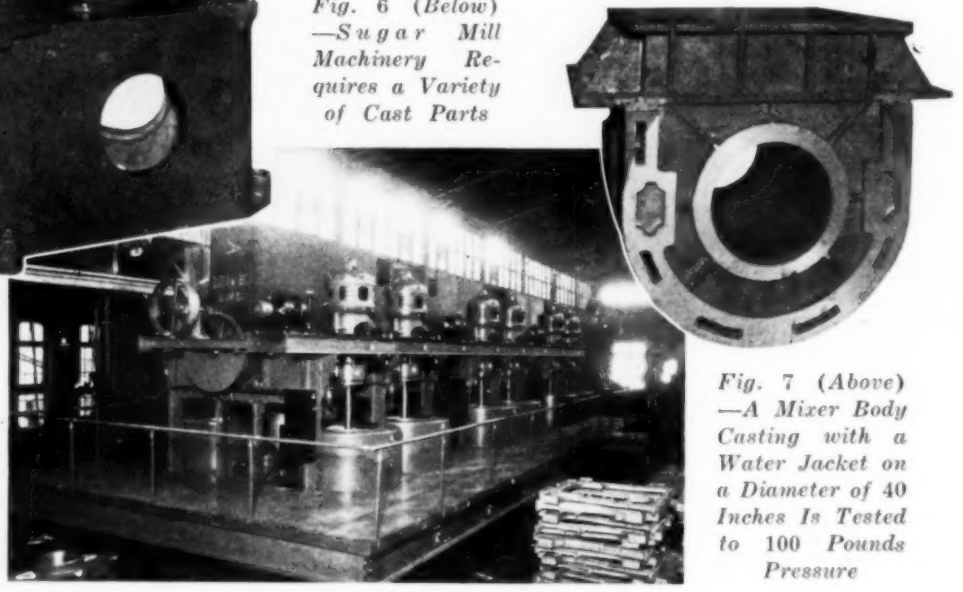


Fig. 6 (Below) —Sugar Mill Machinery Requires a Variety of Cast Parts

Fig. 7 (Above) —A Mixer Body Casting with a Water Jacket on a Diameter of 40 Inches Is Tested to 100 Pounds Pressure

Difficulties encountered in that period turned the attention of the Cresson-Morris Co. to the production of better cupola metals, and in 1925 led to the consideration of the use of alloying elements. Both nickel and chromium were engaging the interest of foundrymen at that time and these were the elements with which the company began its first experiments. Unfortunately, little general information regarding the effects of nickel on cast iron was available at that time and few foundrymen knew a great deal regarding the most suitable methods of making additions of the alloy. Therefore, the company had to start at the beginning. It is not to be wondered that it obtained varied results, for, as is now known, nickel and chromium must be added in proper amounts if beneficial results are to be obtained. J. D. Miller, general superintendent, found this out for himself by empirical methods. Sometimes excellent castings of dense, machinable iron, free from internal shrinkage, were obtained. This situation was gratifying in the face of difficulty that had been encountered earlier especially with cut gear blanks. However, the castings were not satisfactory in many cases.

The varying results obtained caused Mr. Miller to be rather skeptical regarding the use of alloys in cast iron and he determined to make tests to ascertain whether the addition of nickel really had any beneficial effect on iron. Twelve similar pressure castings, each weighing approximately 280 pounds, which were going through the foundry at that time, gave him the opportunity to make the experiment, unknown to the remainder of the personnel. The first charge in the cupola was made with a low carbon content to insure non-machinability and one casting was poured from the spout and laid aside. An addition of 2 per cent nickel shot containing 92 per cent nickel, was made to the second casting and the remainder of the charge was pigged. The remaining 10 castings were poured with the standard cylinder metal. The first two castings were marked plainly for future identification and the lot of 12 was sent to the machine shop, without comment or instruction.

Developments were not long in coming. No sooner were attempts made to machine the castings than an urgent call came from the machine shop for somebody to inspect a casting that was so hard it could not be machined. Special methods and tools had been used without effect. As

might be expected, this proved to be the first experimental casting that had been poured. The machinist was instructed to lay that casting aside and to go on with the remainder. The progress of the second casting, containing 2 per cent nickel, was watched with interest. It was found that the alloy casting could be worked at the regular machine speed and that the iron machined readily, although it might have been classed slightly on the hard side.

This experiment left no doubt in Mr. Miller's mind that nickel had a beneficial effect on cast iron. Having convinced himself of this fact, he set to work to develop the technique necessary to accommodate the plant operations to the use of alloying elements. He immediately undertook an extensive study of the melting conditions and the nature of the irons treated. Realizing that others probably had experienced the same difficulties, he approached the International Nickel Co., New York, with the view of determining methods by which the various difficulties had been overcome. This placed at his disposal the results of an extensive research that had been made of gray iron.

Explains Varying Results

Data from that research disclosed the reasons for the varying results obtained by the Cresson-Morris Co. Others had made the same mistake and had added a given amount of nickel shot to a certain quantity of iron in the ladle without regarding the melting conditions or the analysis of the iron to be treated. It was obvious that the difficulties had been caused by disregarding these factors.

By excercising proper melting practice and balancing the elements in the iron used, the company soon was obtaining consistently good results with additions of 0.50 and 0.75 per cent nickel. The first cost of these castings was no higher than that of the plain castings that previously had been made, taking into consideration the fact that a great reduction was made in the number of rejects. Moreover, the company found that considerable money was being saved in the machine shop. The new alloyed iron was closer grained, stronger, more machinable and free from internal shrinkage. Since many of the castings made had to withstand high pressures, these characteristics were of first importance. That the requirements were met sucessfully is evidenced by the fact that losses on the testing floor were reduced to a minimum.

Today the Cresson-Morris Co. is virtually free from money losses caused by metal troubles in connection with pressure castings. The variety of work turned out by the company is evident from a brief description of some recent jobs.

Molding machine cylinders, similar to that shown in Fig. 5, weigh 3800 pounds, have a 30-inch diameter bore and a cylinder wall 1 inch thick. The cylinders operate under from 80 to 100 pounds air pressure and must be absolutely sound for pressure, close grained for wear and of high tensile strength to resist shock.

Expansion joint bodies, shown in

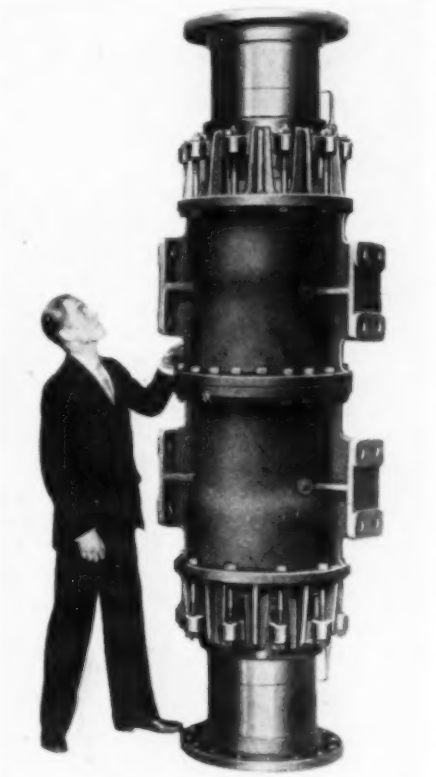


Fig. 8—Expansion Joint Bodies Are Made in Various Sizes

Fig. 8, in various sizes range in weight from 30 to 3000 pounds and in diameter from 3 inches to 3 feet. A medium size has a 16-inch diameter, weighs 540 pounds, has a ¾-inch wall thickness, works under 250 pounds steam pressure and is subject to 350 pounds hydrostatic pressure on the testing floor.

A mixer body casting, Fig. 7, with a water jacket on a diameter of 40 inches has over 13,000 square inches of pressure surface on ⅝-inch walls. The casting is tested at 100 pounds hydrostatic pressure. Previously a considerable number of these were rejected on the testing floor after they had been machined and assembled. So far none made of nickel alloy has been rejected on the test floor.

High pressure cylinder plungers 13 inches in diameter, 13 feet long, with a 1 inch wall, must be free from defects, even ordinary cast iron porosity being prohibitive. These are made so dense that they will take a polish like steel and have a tensile strength up to 45,000 pounds per square inch. The castings are machined readily.

In addition the company makes large quantities of smaller castings and finds that these give excellent results when nickel is added. The company makes a high strength iron with nickel additions which gives a tensile strength between 50,000 and 60,000 pounds per square inch and makes machinable castings up to 65,000 pounds per square inch. These castings are not annealed or heat treated in any way. The nickel alloys made by the company are not limited to pressure castings, but include many other castings used for various purposes. All of the various types of special machinery built by that company invite the application of stronger and better cast iron. Small nickel additions are being made in practically 75 per cent of the company's production, primarily to secure the savings possible in the machine shop.

Plan Annual Meeting

The annual meeting of the American Refractories institute will be held at the Greenbrier hotel, White Sulphur Springs, W. Va., Tuesday May 8. A feature of the meeting will be the discussion of specifications used by consumers for the purchase of refractories. Papers on "Screening of Fire Clays" and "The Cause of Bulging in Hand Made Shapes" will be presented at the meeting.

Buys Wright Company

The American Chain Co., Inc. Bridgeport, Conn., has purchased the business and trade name of the Wright Mfg. Co., Lisbon, O., manufacturer of chain hoists, trolleys and cranes. No changes will be made in the sales organization of the Wright Mfg. Co. H. F. Wright and W. F. Wright will continue in the sales and production divisions respectively of the Wright Co.

Clement J. Hardy, consulting engineer, Chicago, spoke at the regular monthly meeting of the Wisconsin Gray Iron Research group held at the Republican house, Milwaukee, Wednesday evening, April 4. Mr. Hardy spoke on the subject of "New Foundries for Old."

Removing the Hazards from

Piece Price Quoting

Installing a System for Estimating Casting Weights Accurately Requires Small Expenditures—Permanent Records Are Essential

By O. C. Gilbert
(Consulting Engineer, Chicago)

THE two previous articles of this series have been devoted to general considerations and to elements which may introduce error into the procedure of weight estimating. This installment and the concluding article to appear May 15, will present points on installing a weight-estimating system. The equipment required is simple. It includes calculating machines, a planimeter, drawing board, card file, desks, an estimating procedure guide, detailed weight catalogs and forms.

Two compact calculating machines that will add, subtract and multiply are required. The drum type is preferable to the keyboard type, is the former is light and compact and may be moved into position for use or pushed aside without loss of time. Moreover, for this work they are actually more rapid than the large complicated electric machines. One drafting board about 40 x 72 inches is required for layouts.

A standard, letter-size filing cabinet can be used for the filing of blueprints and layouts that have been used for weight estimates.

A standard-size, flat-top desk is required for each estimator. Each desk should be fitted with a collapsible rack for holding large prints in view for checking purposes.

A printed estimating procedure guide should be used in tablet form, the guide providing two places for the checking of each item and the items should include every source of primary error. This guide may be printed on the back of the estimating form.

Detailed weight catalogs are indispensable time savers and should be made up to include every detail that is found to reappear in the drawings. Such details in railway steel castings estimating include weight of journal boxes, brake hanger brackets, lightening holes, bolster center plates, areas of fillets, areas of circles, etc.

Forms for recording estimates should be printed upon a good grade of paper and where the estimating procedure form is printed on the back of the estimate form, the paper should be thick enough so that the periods and commas will not show through and be mistaken for decimal points.

A planimeter is needed for measuring irregular areas. It should be locked permanently in position for full scale readings and all readings made on scale drawings should be multiplied by the factor for that scale. The planimeter should be tested periodically for wheel wear.

The paper used for layouts may be a cheap grade of tracing paper.

Planning the Personnel

The technical requirements of the work of estimating are few but definite. The estimator must have a knowledge of plane and solid geometry. He should be able to make accurate layouts rapidly and must be able to read drawings with speed and accuracy. He should know enough about foundry practice to know where finish is likely to be put on a casting and how much finish should be used. He should be able to recognize an incorrect drawing when he sees one.

The type of estimator best adapted to this work is one who questions everything he sees and who can take a dull, uninteresting, confining routine job, that obviously leads to nothing better, and make out of it an interesting, exciting game by making absolute accuracy his goal.

The first step in making an estimate is a careful analysis of the drawing.

We will assume that the estimating department has received a print for weight estimate. The first step will depend upon whether the print is a drawing made by the company drafting room upon a specialty such as a side frame, bolster, draft gear yoke etc., or is a customer print brought in by the sales department for weight estimate. In the latter case the first step will be to scan the instructions accompanying the drawing to see if they are complete and specific.

Frequently the instructions are incomplete and a trip to the sales department is necessary to find out if finish is desired and how much and whether the rough weight is desired or the finished weight with finish listed separately. Usually, the sales department has other information which they have neglected to submit, such as whether holes are to be cast solid or cored, etc. The estimator also secures this information and his next step is to determine the procedure to be followed.

Steel castings of the miscellaneous type such as locomotive frames, locomotive frame top and bottom rails, pedestal binders, cement mill castings, dry dock wedges, crossheads, steel pulleys, gear blanks, etc., seldom require a layout, as castings of this type are of such shape that the blueprint may be divided by pencil lines into areas having the dimensions indicated by drawing dimensions. Where it does become necessary to scale an area thus marked off, the drawing dimensions nearest this area should be checked to see if the print is in scale and if it is out of scale allowance must be made for this in scaling the part in question. The estimate otherwise is identical with

one made from a layout and is checked in the same way.

However, if the estimate is to be made upon a specialty design that may go into large production, the procedure is quite different.

The procedure now will depend upon whether the foundry has just put in the piece-price quoting system or whether it has had this system in operation for some time. In the latter event the procedure will depend upon whether the method has been operating upon an accurately controlled basis or has been operating, but with doubtful efficiency.

The elaborate methods of analysis and the ingenious devices to make truce with necessity that are employed in the latter case will not be considered here as this article is intended for the use of foundries installing an accurate system or developing an accurate system from an unreliable one.

The first step will be to examine the blueprint carefully, reading the legend at the bottom of the print, noting the scale or scales used, as well as any special legends appearing on the drawing.

The drawing number and issue letter will show whether it is a new design or an old design with changes. The pattern number will indicate if it is a new pattern or a re-issue of an existing pattern. If it is a new design not hung upon an existing pattern, a layout must be made. A subsequent article will show the method of making a side frame layout as well as the method of estimating and checking.

However, if the drawing is a new issue of an old design upon which a weight estimate has been made the procedure will be as follows:

The drawing is examined to see if the print has been checked by the drafting room checker. No specialty print should be accepted for estimate by the estimating department that has not been so checked.

The next step is to determine whether the print in the history file is the same as the print submitted for estimate. It is true that both bear the same issue letter and both are checked but they will sometimes be found to differ due to the fact that the first print from the checked tracing is sent to the estimating department and if the tracing was hurriedly checked, the checker may review his work in which case if he finds errors he is likely to correct them on the tracing without changing the issue letter, expecting to recall the estimating print. This he may neglect to do. Because of this danger, the few minutes' time required to compare the history file print with the estimating print is well spent.

Next, the estimating print is checked against the last issue for which the files show a weight estimate and the altered dimensions are indicated on the estimating print by a red pencil circle. All dimensions on the print should be encircled either in red to show change or in yellow to show that they remain unchanged.

After this is done the estimator may determine whether the weight estimate safely may be made by difference from the base. The magnitude of the changes that he can handle in this way will depend partly upon the skill of the checker who will check this estimate, as checking an estimate based upon the difference between two drawings is frequently more difficult than making the estimate.

If it is decided to make the estimate by difference, the next step is to secure the file card for the design used as the base. This card is scrutinized carefully for possible errors lurking in it. Such errors are sometimes indicated by variations in the estimated and the shipping weight of the castings from the pattern, although, as has been shown, a net weight still may cover a 50 or 60-pound estimating error.

If the pattern number shows that the design is an issue of an existing pattern having other patterns hung on the base design, the back of the weight file card should be entered with the pattern history.

Provision should be made on the back of these cards for four columns of data. The first column is for the pattern number; the second for the drawing number; the third for the estimated weight and the last for the running weight. Each time the card is used it should be brought up to date as to all of these data. A representative card showing front and back is shown in Figs. 1 and 2.

With the history of the pattern before him the estimator now gets together all the weight cards showing weights hung upon this pattern base

(*Concluded on Page* 373)

FIG. 1—BELOW—FACE OF FILE CARD USED FOR PERMANENT RECORD OF WEIGHT OF INDIVIDUAL CASTINGS. FIG. 2—RIGHT — REVERSE OF CARD, SHOWING WEIGHT ESTIMATE, REVISION AND ACTUAL CASTING WEIGHT OBTAINED

Casting BOLSTER 50 TON A.R.A. DOLMAN BARBER				Drawing Number 9763	
For A.B.C.R.R.					
				Weight	Revision
EST.	C.E.R.	10/2/27	NEW ESTIMATE	~~702~~ lbs	—
CK.	X.Y.1	10/3/27	" "	709 lbs	—
EST.	XY.2	11/7/27	BY DIFFERENCE FROM ISSUE	720	A
CK.	C.E.R.	11/8/27	" " " "	720	A

Pattern Number	Drawing Number	Estimated Weight	Running Weight	
973	9622	691	(2) 690 (2) 695 (30) 693 (30) 689	
973A	9763	NEW EST. 709	2) 699 (30) 700	
	9763A	720	(30) 715	

How and Why in Brass Founding

By Charles Vickers

Is Utility Alloy

We note that in answering questions the 85-5-5-5 alloy is referred to frequently. Would this be suitable for a casting as large as 400 pounds? Would its heat conductivity be better than that of cast iron? Could you suggest an alloy which can be cast and possesses a better heat conductivity than the 85, three fives? How does the heat conductivity of aluminum compare with that of bronze castings?

The alloy 85, three fives, is referred to so frequently because it is a standard brass foundry alloy suitable for certain classes of steam goods and other castings for which a red brass can be used. It is so well known there is little danger of anyone going far astray due to using it for ordinary castings, and it can even be used for common bearings. In short it is a fairly good, general utility alloy. There are better alloys for many special purposes, and also there are cheaper alloys which can be used in numerous cases with just as good results as 85, three fives. This alloy, however is selected because it represents ordinary standard foundry practice in alloying.

In the case of heavy castings, however, it is not such a good casting alloy. A better casting alloy is copper, 87 per cent; tin, 7 per cent; zinc, 3 per cent, and lead, 3 per cent, which is an alloy suitable for high grade valve bodies and steam brass work generally. Whether it is suitable for the casting cited we do not know as the alloy must be selected for the service it is to be put to.

We doubt whether there is any difference in the heat conductivity of 85, three fives and the alloy just given. To get much advantage there we feel it will be necessary to use copper. A copper having high electrical conductivity also will possess a high heat conductivity, although this may not obtain in the case of all metals. The heat conductivity of pure aluminum is greater than that of red brass such as the 85, three fives. That of aluminum alloys is likely to be a little less than that of pure aluminum. The latter will have roughly about half the thermal conductivity of copper, and three times that of cast iron. That is the main reason for the use of pistons of aluminum in internal combustion engines. There is no great difference of thermal conductivity in the various alloys known as red brass. They will possess roughly about half the thermal conductivity of aluminum.

Must Vent Mold

We are having a little trouble making a bronze casting of peculiar shape. The general appearance is that of a dumb bell. That is there are two ends of large size connected by a narrow center piece which has to be formed by a hanging core in the cope and a corresponding bulge in the drag. The metal along this section is only $\frac{3}{16}$-inch thick. On polishing the castings we find a group of pinholes on the thin section. These holes are fine like gas holes. We pour from one side and take risers off from the other side, cutting two runners parallel with the length of the casting, on which the sprue rests on one side and the riser on the other. The runner is connected to the casting by four gates equally spaced, and opposite to them are four gates to the riser runner. The composition of the alloy consists of copper, 88 per cent; zinc, 6 per cent; tin, 5 per cent, and lead, 1 per cent. We send a rough sketch of the gating, and a piece of the defective metal. Can you advise us as to the cause of the difficulty?

While the sketch shows how the casting was gated it fails to reveal the shape of the casting, therefore, it is not possible to suggest changes in the manner of gating, and so this assistance cannot be given in this case. As the pinholes are localized they are due to some defect in the mold. It may be the gates, or it may be caused by insufficient venting. If the molding sand is of fine grade, a thorough venting with a thin knitting needle of the *drag* part of the mold under the thin part, might remove the cause of the porosity which appears to us to be due to steam passing through the metal from the drag part and into the cope. As the brass is thin at this point the steam passes right through the metal and continues to maintain its pathway after the metal has cooled beyond the flowing point. Thus, minute holes are left in the brass. It would be advisable also to vent the cope, but the important part is the drag. Since jabbing a vent wire through the mold to the pattern only will add to the impermeability of the sand when the metal is allowed entrance into the vents, be careful to shut them off on the sand surface covered by the metal. Also provide means for the escape of the gas from under the bottom board.

May Cause Variations

Suppose we have two castings of the same alloy; can one casting be harder than the other, and can there be any difference in the color after they are machined? If this is possible, what is the cause?

If the two castings varied in hardness and color, and were made of an alloy having a copper base, the alloying metals being tin, zinc and lead, one would be justified in assuming the castings were not made of one and the same alloy. If the two castings were poured from the same heat of metal, even then the chemist would find they were different in composition provided they varied as stated, and the reason for this condition or difference would be failure to properly stir and mix the alloy before it was poured. In the case of aluminum bronze on the first melt it is particularly easy to obtain two alloys from the one melt. One alloy may be brittle and glassy and the other soft and ductile. With large castings the two alloys can be found, the brittle, glassy one on the cope side, due to its lower specific gravity. This happens because the alloy was stirred, instead of being pumped after the addition of the aluminum.

In the case of tin bronzes we can get a similar result, and usually this is due to the fact the crucible was too full of copper, and after the tin or other white metal addition, and usually it is tin, the metal could not be stirred because it would swish over the sides into the furnace. The result is that the tin floats on the copper and we have two different alloys in the same pot. Of course, there are many variations of such imperfect admixtures. The difference in the color of alloys is a pretty certain indication of a difference in composition. The hardness is not so certain, but taken with the different color it acts as a confirmation of a difference of composition.

Operates Stove Foundry CONTINUOUSLY

Peninsular Stove Co., Detroit, Equips Mechanically to Mold, Pour, Clean and Assemble Stoves and Furnaces

By Pat Dwyer

MELTING equipment and conditions in the foundry recently placed in operation by the Peninsular Stove Co., Detroit, present marked contrast in many ways to those employed in the old plant on Fort street, west, where the company carried on business for nearly 50 years. This does not necessarily mean that the old equipment was antiquated. Rather, it is intended to convey the impression that the new shop is what is known colloquially as ahead of the times. The old foundry was operated in the same manner that stove foundries have been and still are operated. That is molding is carried on for 6 or 7 hours each day. The remainder of the time is devoted to pouring the metal and shaking out the castings. A night gang removes the castings, cleans the gangways and cuts the sand over into long piles for the floor molders or into more compact piles close to the benches or squeezer machines. At one time all this sand cutting was done by hand, but in recent years practically all the large stove foundries and many of the small ones have installed automotive sand cutting machines for this purpose.

In the new foundry of the Peninsular Stove Co., melting, molding, pouring, shaking out and sand preparation go on continuously and simultaneously for the entire 8-hour day. There is no night force. The extent to which mechanical equipment and improved methods have reduced labor costs all through the plant is typified in the cupola department where four men handle all the materials for a daily heat of 60 tons. One man operates the yard crane and the hoist on the charging floor. Two men fill the charging buckets and one man weighs the materials and operates the car on which the loaded cars are taken to a point shown in Fig. 4, under the charging floor hoist.

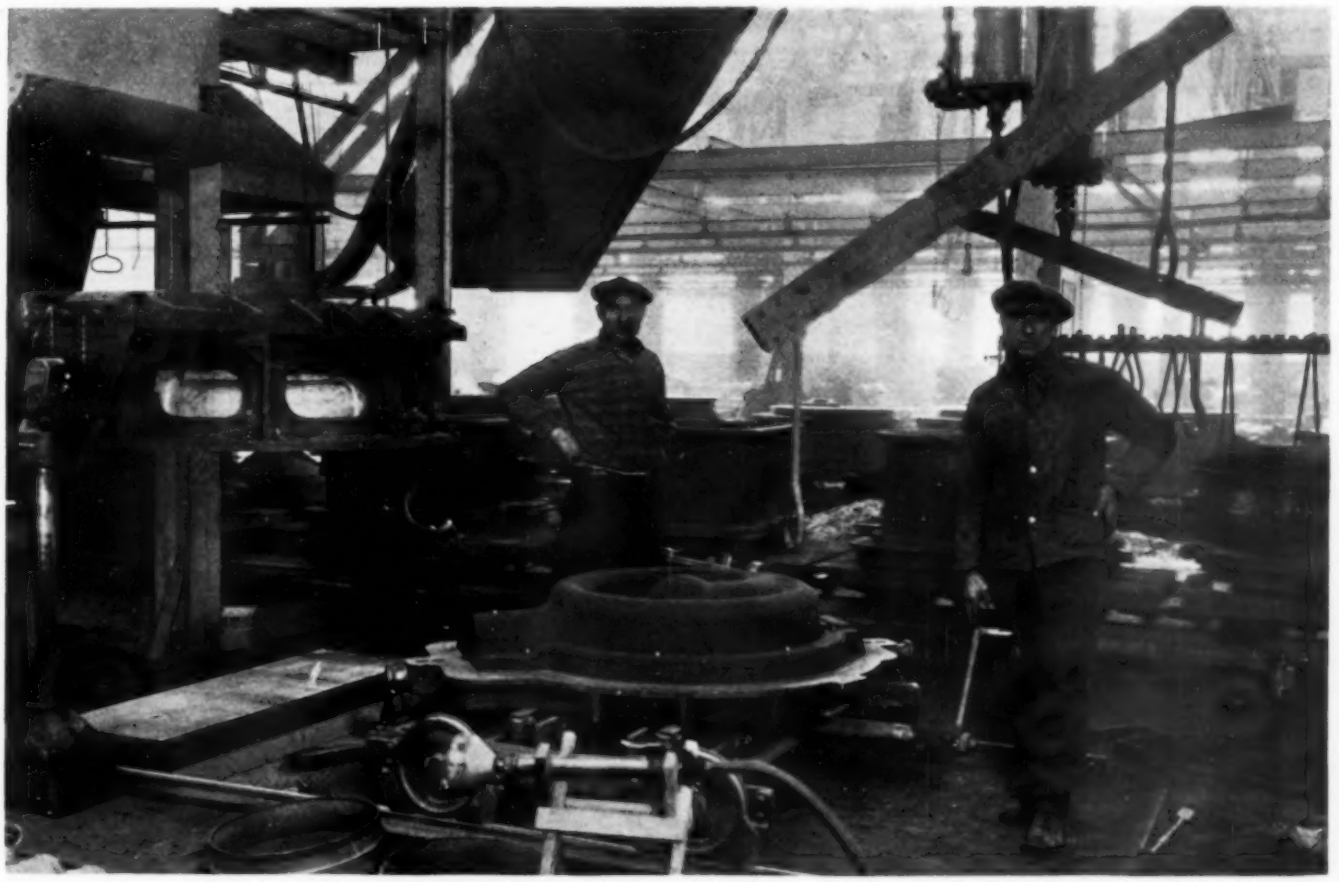


Fig. 1—The Inside Part of a Radiator Mold Is Rolled Over on a Planed Cast-Iron Plate Instead of a Drag. The Cope Is Rammed on an Adjoining Machine not Shown in this Illustration

Fig. 2—A Light Transfer Car Receives the Mold After It Has Been Rolled on the Machine. The Transfer Car Is Equipped with an Equalizer Leveling Device which Automatically Adjusts Itself and then Is Locked in Place Before the Pattern Is Drawn from the Sand

Charging equipment, including the yard crane, the buckets, the charging floor hoist and the monorail and switches leading to the doors of the two cupolas were supplied by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

Original plans called for a roof over that part of the yard immediately in the rear of the cupola. Necessity of starting operation ahead of the contemplated schedule postponed the roof in favor of a temporary shed as shown in the illustration Fig. 8. Eventually the permanent roof will be placed over the central part of the yard to protect the coke and the men engaged in making up the charges.

The ground floor back of the cupolas is on the same level as the floor of the foundry. A concrete lined pit, 5 x 5 x 30 feet, extends from the outside of the floor to a point 8 feet inside the wall of the building. With the exception of an opening near the bottom through which the buckets move in and out as shown in Fig. 5, the wall is built in the form of a rectangular shaft extending upward to an enclosed opening in the steel charging floor shown in Fig. 11.

An electrically-operated car equipped with a scale made by the American Kron Scale Co., New York, moves backward and forward on a narrow gage track in the bottom of the pit. This car has accommodation for two charging buckets with tops that come flush with the floor. Each bucket has a capacity for an entire charge of 2000 pounds of iron, 350 pounds of coke and 50 pounds of limestone. The iron charge is made up of 200 pounds of high silicon pig iron, 800 pounds No. 2 foundry pig iron and the remainder foreign and domestic scrap.

Buckets are loaded with the pig iron on the bottom, the scrap next and the coke and limestone on top. In charging the cupola, 1½ bucket loads of coke are placed on the bottom. The remaining half bucketful is dumped before the first charge of iron is placed. Temperature, fluidity and uniformity of the iron resulting from this mechanical charging method are fully equal, it is claimed, to the same features in iron carefully charged by hand in the generally accepted and orthodox manner.

Filling the buckets is greatly facilitated by having the tops flush with the floor. Lifting is reduced to a minimum since the men simply lift the material from the floor and drop it into the bucket. Scrap and coke are piled on one side of the pit close to the edge. Two varieties of pig are piled in a similar position on the other side. The scale operator moves the car backward and forward to the most convenient point to eliminate any walking on the part of the loaders.

Theoretically, every charge totals 2000 pounds of iron, but as every foundryman knows this is a physical impossibility under actual operating

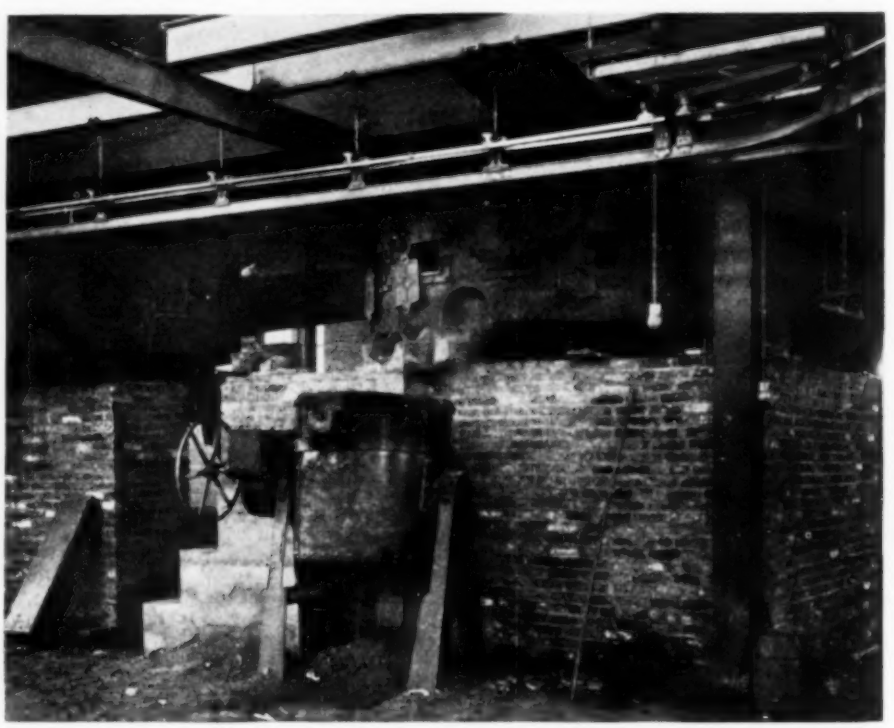


Fig. 3—Metal from the Cupola Is Tapped into a Mixing Ladle Provided with a Skimmer Spout. Small Ladles Suspended from the Monorail Are Employed to Convey the Metal to the Various Pouring Stations

conditions. It is not practical to break the last pig in every charge to make the actual weight down to a pound. In the method practiced in this foundry the theoretical weight is approximated, but the actual weight is set down on the charge sheet. Thus if the weight on the scale is 2020 pounds, it is set down as 2020 and not as 2000. Assuming for the sake

Fig. 4—Charges for the Cupolas Are Made Up in Buckets Mounted on a Scale Car Operating in a Concrete Lined Pit in the Floor

of argument that each charge runs 20 pounds over on every charge, it is apparent that with a heat of 60 tons daily over a normal period of 200 days a year, the difference between the theoretical and actual amount of iron consumed will be 240,000 pounds, or 120 tons, quite a tidy item. This may serve as a hint to foundrymen whose inventory at the close of the year does not check up with the totals shown on the charging sheets. Coke and limestone, of course, may be weighed accurately to meet the theoretical requirements.

Iron is lifted from the stockyard with a magnet suspended from the crane and dropped on a sloping wall down which it slides by gravity to the level space provided for the purpose close to the edge of the pit in which the scale car operates.

Coke is handled in a slightly different manner by a specially-designed grab bucket which it is claimed does not crush the coke. Thus all breeze is avoided. Coke falls by gravity from the bottom of the railroad car into a concrete hopper under the track. This hopper has capacity for a full carload and tapers on all four sides down to a rectangular opening, 3 x 6 feet, at the bottom. Coke falls through the opening into a steel box with a sliding bottom.

The bucket in closed position is lowered into an adjoining pit provided with vertical guide rails on either side curved at the bottom. The curves carry the bucket under the steel box where its weight trips a lever and allows the coke to fall into the bucket which has a capacity of approximately 2 tons. The crane operator's cab is located directly above and when he sees that the bucket is nearly filled he commences to hoist. This action releases the trigger which closes the bottom of the steel box. The bucket then is lifted out of the pit and conveyed to a point close to the scale car station where it is lowered close to the floor or the existing coke pile. The bucket then is opened in the usual manner and the coke falls out gently. Coal for the boilers also limestone for the cupola are handled in the same manner.

Fig. 6—Hot Castings Are Lifted from the Shakeout with a Long Handle Hook Suspended from a Chain. The Castings Are Transferred to Hooks on a Conveyor which Takes Them on a Cooling Journey over the Roof and then Deposits Them Near the Sandblast Chamber

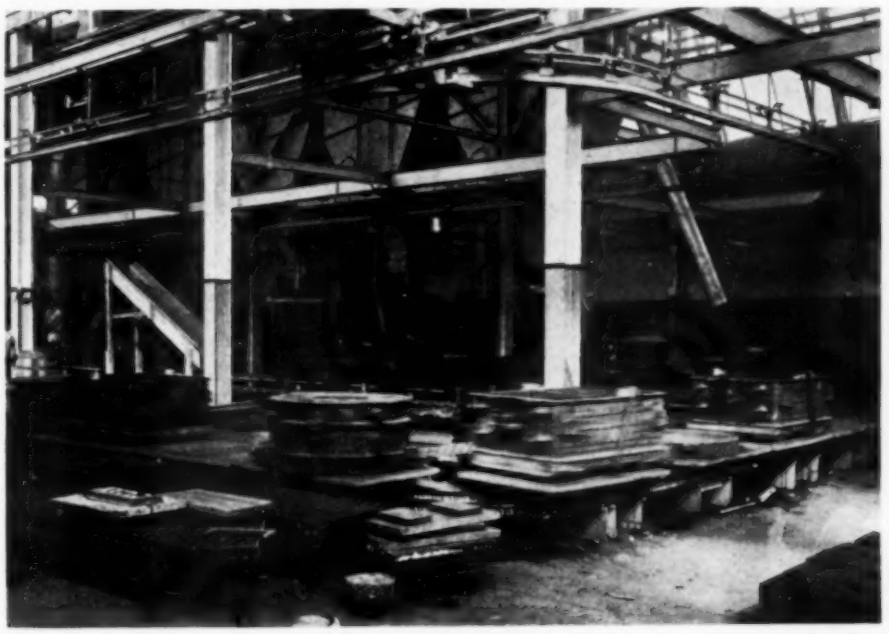


Fig. 5—Molds for Grates and Firepots Are Made on the Machine Shown in the Background. The Power Driven Conveyor Carries Them Past the Pouring Station to the Shakeout

One Man Handles Job

Each cupola holds 15 charges when filled to the charging door which means that the last charge is in the cupola two hours or more before the close of the day. During this two hours the charging man operates the yard crane and replenishes the coke and iron piles for the following day.

In practice the scale car with one

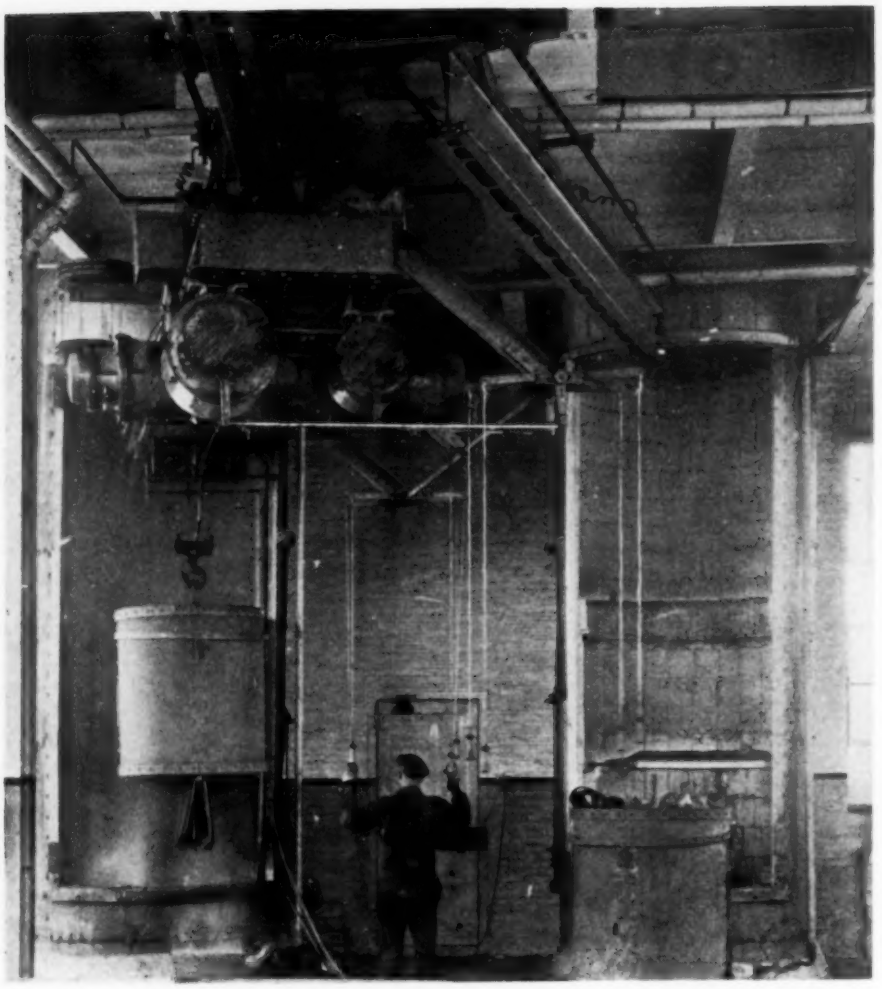


Fig. 7—By Throwing a Switch in the Overhead Track the Charging Buckets May Be Sent to Either Cupola

loaded bucket in position is advanced to a position under the shaft leading to the charging platform. The operator above lowers an empty bucket to the car. The crane hook is detached from this bucket and hooked into the loaded one. The loaded bucket then is whisked aloft and the scale car with the empty bucket is backed to a point where the bucket may be reloaded. The operation is repeated steadily until a sufficient amount of material has been taken aloft for the day. In an emergency several loaded buckets may be stored on the charging floor, but under normal conditions the floor is kept perfectly clear.

The hoist for lifting the buckets is suspended from a monorail in the form of a Y with the single stem over the open shaft and with a branch leading to each cupola. A suitable switch at the junction controlled from the floor serves to guide the load toward either cupola.

After the loaded bucket enters the cupola, the operator releases a catch which discharges the load through a drop bottom into the cupola. In the beginning the bucket is lowered any required distance into the cupola to minimize the fall of the material. Gradually as the column of stock rises the distance is decreased. Thence forward the top of the column is maintained flush with the charging floor until all the material for the day has been placed in the cupola. When the bucket is lowered to the floor the two half bottom doors snap into closed position and are locked.

Two 72-inch cupolas built by the Northern Engineering Works, Detroit, are employed alternately each day for melting the iron. Each one is double lined to a working diameter of 54 inches with a bosh 40 inches diameter above the tuyeres. A cast-iron ring projecting 4 inches from the wall opposite the door opening acts as a bumper and prevents the entering steel bucket from smashing the brick in that vicinity. When the cupola is relined the superintendent proposes to line all this area with cast-iron blocks.

Lon Kimball, general superintendent and practical foundryman of many years' experience, has introduced many interesting kinks and innovations in the mechanical equipment and methods of operation practised in this new foundry. One is a device for utilizing some of the waste heat in the cupola to circulate hot water in the employe's washrooms. The hot water line also is connected with the feed water line leading to the boilers which supply hot water to the radiators which heat the building. It is claimed a substantial saving in the coal bill is effected in this manner.

The idea is based on the familiar water back placed in kitchen stoves for heating the family water supply in a galvanized or copper tank mounted close to the stove. In this instance a glorified water back is built into the lining of the cupola about 2 feet below the charging door and piped in the usual manner to a supply and outlet. The heat in this section of the cupola is sufficient to raise the water to a high temperature, but not intense enough to affect the iron in the waterback casting.

The wash and locker rooms for the men are located on the rear of a mezzanine floor below the charging plat-

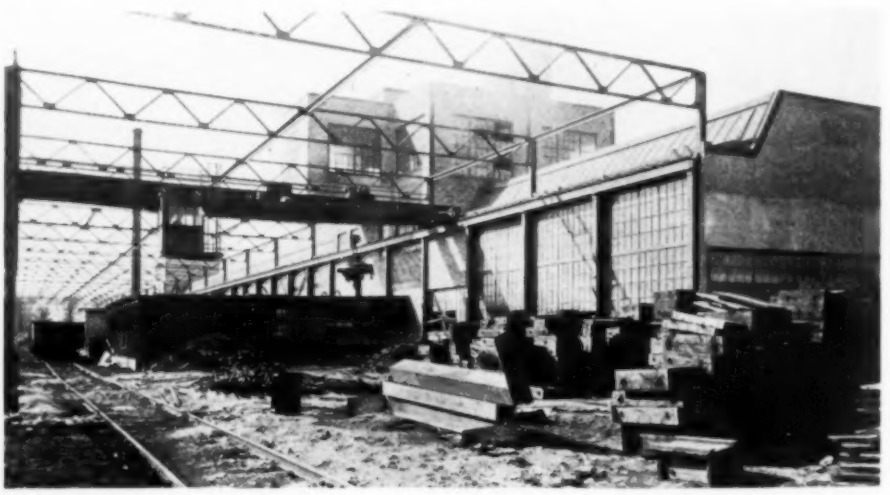


Fig. 8—Pig Iron and Scrap Are Handled in the Stockyard by a 5-Ton Crane. A Special Grab Bucket Is Employed for Handling Coal, Coke and Limestone

form. Large stationary wash basins, also shower baths are provided.

Blowing equipment for the cupolas was supplied by the General Electric Co., Schenectady, N. Y., and includes one centrifugal type compressor, with a potential capacity of 7500 cubic feet of air per minute; one direct-connected constant speed induction motor rated 58 horsepower—220 volt, 3 phase, 60 cycle. The load is taken by the motor in the usual manner through a starting compensator. Under present conditions the blower is not operated near its ultimate capacity.

The two cupolas are located approximately 50 feet from the east end and 30 feet from the south wall of the foundry building. Each one is enclosed on three sides by a curtain wall which extends up to the level of the furnace bottom. The wall prevents splashes, accidents and a general mess when the bottom is dropped at the close of the day's run. Iron is melted continuously all day except during the 30-minute lunch period at noon.

Molten iron from the cupola is tapped into a 2-ton ladle mounted on suitable stands and equipped with a skimmer spout and tilting mechanism. The iron is poured from this mixing ladle into a number of 1000-pound ladles suspended from a monorail which extends to the various pouring stations. Furnace castings made on the two units described in a previous article, April 15, are poured direct from these ladles. Small miscellaneous parts on the third unit, also the stove plate castings made in the south section of the foundry, are poured from hand ladles filled from the ladles hanging on the monorail. Manifestly the iron must be melted at an exceedingly high temperature successfully to withstand so much transferring from one ladle to another and still retain sufficient fluidity.

Green sand cores shown in Figs. 1 and 2 illustrate an interesting departure in the method of molding furnace castings. The drag flask has been eliminated. The core is left upon the bottom plate and the cope is closed down over it to make a complete mold. These molds and all other molds made in this foundry, with the exception of those made by hand, are made on molding machines furnished by the Osborn Mfg. Co., Cleveland. This company designed the layout, furnished the equipment and supervised the installation of everything required for preparing and distributing the sand and making the molds.

An aluminum pattern inside a stiff cast iron frame is mounted on the table of a jolt rollover molding machine. The pattern, which in this instance really amounts to a corebox, is filled with sand from an overhead supply bin. The sand is jolted, struck off and then a planed cast iron plate provided with trunnions on the sides and strengthening ribs on the bottom, is guided into place by suitable pins and clamped in position on the bottom of the pattern-corebox. The assembly is raised and rolled over and a transfer car is pushed underneath to receive the load.

The transfer car is equipped on the face side with an equalizer leveling device which adjusts itself to the bottom of the plate. It is locked in this position by a crank handle attached to a horizontal shaft. The clamps are released and the pattern-corebox moves straight up, leaving the body of sand supported on the cast iron plate. The transfer car is pulled out and the part of the mold lying upon it is picked up by an air hoist operating through an equalizer beam and pair of slings, and placed on the nearby power driven conveyor. The pattern-corebox is reversed and lowered on to the jolting table where the sequence of operation is repeated.

Fig. 10—Buckets Are Hoisted Through a Shaft Extending from the Ground to the Charging Floor

A second machine is employed for making the cope. This machine is equipped with a stripping plate through which the pattern sinks before the cope is removed. The cope is not rolled over. It is taken directly by an air hoist and lowered on to the part previously described. A runner basin is formed on the upper side of the cope. The radiator section shown in Fig. 1 is poured through a circular basin connected to several pencil gates located over the highest point on the core. A strainer core is set in the bottom of the runner for the mold shown in Fig. 2. All the molds in this department are made in cast steel flasks machined on the joints.

Cupolas mark an imaginary boundary between the continuous foundry and a section where a wide variety of small stove and furnace parts are made for the repair and replacement market. Orders for some of these castings come from customers who bought the original units in the early days of the company's history. This section also contains a single floor in the southeast corner where aluminum is melted and poured into molds

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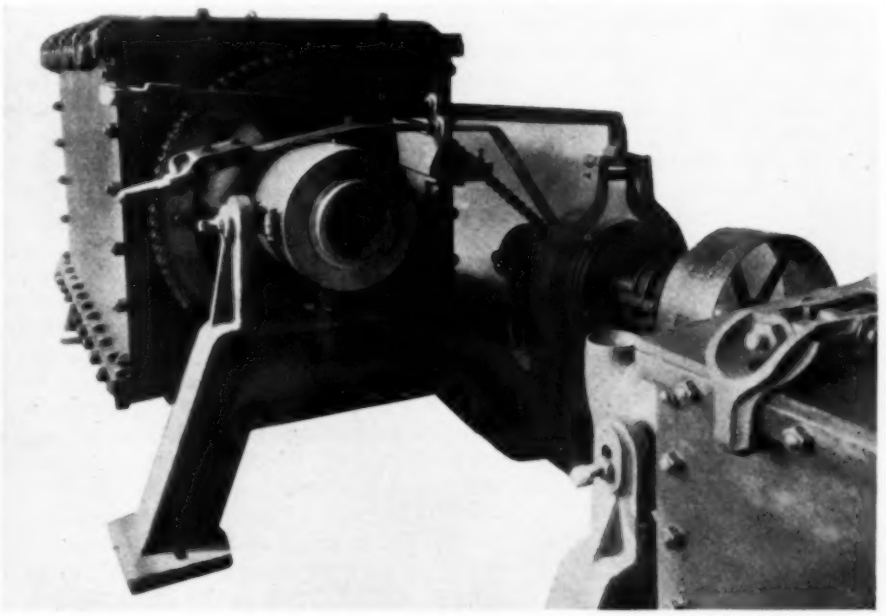
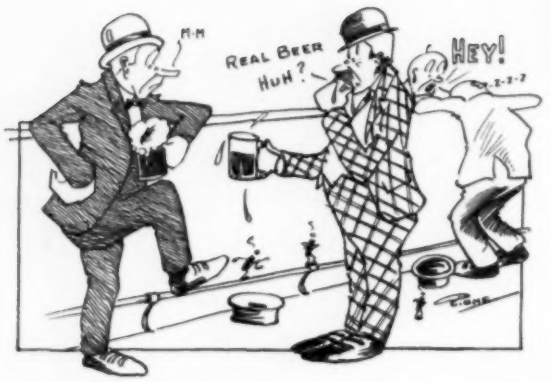


Fig. 9—All the Tumbling Barrels Run in Roller Bearings and Are Connected to a Dust Exhaust System. The Cylindrical Barrels Are Belt Driven Through a Gear and Pinion but the Square Barrels Are Driven by a Roller Chain and Sprocket



Bill Touches on Some Problems in Molding-IV

By Pat Dwyer

WHENEVER I see a picture of a group of men taken about the middle of the past century I sigh heavily. I am tempted to wish I had flourished during that care free and happy period when men were men and barbers were anathema; when hair cascaded luxuriantly down over neck and shoulders; when noble beards concealed every feature except the eyes and covered everything in front down to the second button on frock coats rolled as tightly as umbrella covers.

This laudable desire on my part, needless to say, is not based on vanity. If I followed my inclination, some enterprising side show impresario probably would attempt to sign me up as the original wild man from Borneo or a lineal descendant of Jo-Jo the dog-face boy. My interest in the subject, to be perfectly truthful, really is only academic and is based on the time I might save and the trouble I might avoid in the daily shave and the periodical visit to the hair cutter.

Up to the present I have formed no clear conception of how I should profit by this spare time, but why trouble over a trifle like that?

The majority of the bewhiskered gentry depicted in these old prints lived to a hale and hearty old age. I never have seen or heard the claim advanced, but without doubt this remarkable longevity was due principally to the protection afforded the eye, ear, nose and throat and, ladies and gentlemen, the vital resp-ireatory organs by the luxuriant and impenetrable brush. Ordinary germs simply curled up and died on the outer defenses. Even the most virulent and persevering type became hopelessly lost in the ambuscade before they reached a vital spot. Evidence of this condition is found in the fact that germs never obtained recognition or a place in our literature and social chitchat until after men adopted the fashion of clipping their hair short and exposing their naked faces and Adam's apples to every wind that blows.

The foregoing and several related lines of thought were running through my mind the other night when Bill came in to help me spend an idle hour or two.

Although smooth shaven for many years, Bill at one time or another has cultivated crops of varying extent and luxuriance on his leathery old phiz. About the turn of the century he had as fine a moustache as ever was dipped into a schooner of beer. His technique at that period was flawless. Commencing with the courteous "Here's looking at you," or "Happy days," or the flippant "Down the rat hole," the right arm was moved in a gradually ascending arc designed to transfer the contents from the glass to his capacious maw with a minimum of effort. After replacing the glass on the bar, the gill or two of residuum held by capillary attraction in the moustache was removed by grasping the overhang firmly between the upper and lower lips and creating a slight vacuum immediately in the rear. A graceful and nonchalant gesture of the first and second fingers of the right and left hand applied alternately restored the bush to its accustomed curves.

For one period he had sported a set of sideburns in addition to the ferocious moustache. On another occasion he had entered into some kind of a silly compact with a gang in the shop and did not shave from the day of the first snow fall until after the ice had broken up in the harbor and the roaring siren of an ore boat coming in past the lighthouse announced that spring had arrived.

With a background and experience of that character I felt that Bill was in a position to express an expert opinion on the subject of beards and other hirsute appendages, adornments, fringes, top knots or what have you, on the male head piece. I put the question to him plainly man to man, and asked him bluntly if he thought a man was better off with a bare face and a closely cropped knob, or with everything above the shoulders hidden in a mop of hair like Santa Claus.

"Well," said Bill, "I'll tell you. A great deal depends on what you might call the general topographical features of the gent in question. A good, brave, robust beard, red, brown or black, sits well on a big man, but makes a small man look like a Skye terrier. A long patriarchal white beard confers an air of benignity and wisdom on elderly gentlemen whose achievement in one line or another has entitled them to respect. Michael Angelo knew his business when he depicted Moses the law giver as a stalwart figure of a fighting man with a long flowing beard. Any reference to fashions in hair and beards," Bill continued, "always revives an old doubt in my mind about that story of Samson; you know, the woolly bird who had his hair cut off while he slept." "The story sounds plausible to me," I said. "Why should you doubt it?" "Put yourself in the guy's place," Bill replied. "In those days the people had no shears. They did not need 'em. Hair cutting was an unknown

IT WON'T BE LONG NOW. HEH! HEH!

art. Therefore, it is only reasonable to suppose that Delilah either hacked off the giant's hair a few strands at a time with a dull copper knife or pounded it off between two stones. A possibility exists that she may have bitten it off. I wouldn't put a trick of that kind past that foxy dame. She was a vicious handful. In any event do you think you would have lain there unconscious with your mouth open during the operation? Fat chance! At the first or at most the second tug you would have been on your big hairy feet, howling and clawing down the rafters. Then you would give the little lady a hand in such a whole-hearted and enthusiastic manner that she would be cured effectually of her craze for hair cutting."

"I think," I said, "that you are letting your imagination run away with your common sense. You have no proof that Delilah had no shears. How do you suppose the people in those days removed the wool from their sheep? I suppose you think they plucked them like so many chickens, hey? My own private opinion is that the ancients were just as vain as we are and had all the necessary tools and equipment for trying silly experiments with their heads and faces."

"Silly is right," Bill agreed wholeheartedly. "In later years I have become resigned to my fate and allow the barber to trim me to his liking, but I can remember quite distinctly how bitterly I resented the ordeal when I was a harum-scarum young cub with a wisp of hair sticking up through a convenient hole in an old straw hat.

"According to the custom of those days my mother was an all around practitioner who could turn her hand to anything, including hair cutting. Naturally, in the multiplicity of duties she had little time or inclination to dawdle over a job. Looking back now I am lost in amazement and admiration at the volume of work that passed through her capable hands.

"She wasted no time in idle preliminaries or beating about the bush. I might dodge the ordeal for a few days, but inevitably I was caught. Fortified by experience and a low species of animal cunning, I shunned the house as much as possible when the hair commenced to creep down around my ears. Watching my chance I sneaked into the house after school, tossed the books on the nearest table or chair and darted out again, to remain in comparative safety until hunger again drove me homeward. I was safe until the next day because I knew she would not attempt the operation by light from an oil lamp.

"The period of respite was brief. Invariably I was grabbed and led to a position near the window where I had to kneel ignominiously on a cushion with a gingham apron tied around my neck. A pair of determined knees nipped me by the ribs and prevented any squirming. My agonized protest that the comb was tearing long furrows in the scalp and that the dull scissors was pulling the hair out by roots instead of cutting it, calmly was ignored. Sometimes I was told that unless I shut

WHY BOYS LEAVE HOME

up and kept still I would get the top of an ear clipped off and see how I liked that. I did not like it so much!

"This periodical foretaste of purgatory continued until I was nearly 14, when I accepted an important and lucrative position in a glass factory carrying with it the munificent stipend or honorarium of 50 cents per day. Manifestly it was up to me as a man of affluence to patronize the local barber and boost the local industries in the old home town. In this as in many other experiences later in life I learned that while the spirit may be willing, the flesh is deplorably weak. The good old do or die, one for all and all for one factor of co-operation is conspicuous by its absence.

"With a modest allowance from my first week's pay in my pocket and a more confident feeling of financial independence than I ever have enjoyed since that time, I approached Billy McKenzie's lately opened Tonsorial Parlor, Hair Cut in the Latest Mode 15 cents, Shave 10 cents.

"Billy had returned recently from the large and fashionable city of Boston, the Mecca of all Down-East youth of both sexes. He brought with him and introduced many startling innovations, including the application of a towel wrung out in hot water, witch hazel rubbed on the face, followed by a light dusting with talcum powder. A row of marvelous shaped bottles containing potent tonics of various kinds ornamented the shelf in front of the long mirror. Billy, himself in spotless white, with a moustache waxed to needle points and with his hair slicked down in the center of his forehead and then swept up to one side in a graceful French curve was the acme of courtesy. During his year's residence in Boston he had acquired almost complete control over the broad *A*. His conversation contained many light, casual, intimate references to people, events and localities in the Big Town where John L. Sullivan still reigned the undefeated champion of the world.

"Competent observers admitted that Billy's shop would compare favorably with any on Tremont or Washington street. Lacking personal knowledge, several gentlemen would not state positively, but they doubted if anything finer could be found either in the Touraine or the Parker House.

"Information on these various points came to me later. At the period to which I refer Boston was only a name and the interior of a barber shop was no more familiar than one of these here now ingle nooks or igloos or whatever is the name of these dumps in which the Eskimos hide during the winter. What do you suppose induces human beings—I wonder if they are human—what do you suppose induces these unfortunate creatures to live—well I won't say live—why do these people remain in that God-forsaken territory for the entire period of their natural lives?"

"They stay there," I explained, "because they don't want to listen to silly questions. For heaven's sake stay in one place and get your hair cut. I hope the barber stunned you with a mallet before he commenced to operate."

"Fortunately," said Bill, "the barber did not have your blood thirsty and savage complex. I don't know if he realized the superhuman effort of will I exercised in entering the sacred temple. A furtive look around showed me the three barber chairs occupied and several citizens seated in ordinary chairs by the wall. I had time to notice the course of procedure before my turn arrived and felt I could go through the performance with credit to the old family name. I had not reckoned on Billy's sly humor. Having seated me properly in the chair he asked me gravely if I wanted a shave or a hair cut. The question greatly amused the other gentle-

men present, but it caused me to blush from my toes to the top of my head and reduced me to a state of stammering imbecility.

"Before he was through and I suppose after he had forgotten all about his little pleasantry, I had revolved a dozen biting retorts I might have made. Retorts ranging in virulence from the usual 'pull down your vest,' or 'shut up' to really ambitious reference to his personal appearance, habits and probably indefinite ancestry. I had almost decided to take one swift poke at him and run the instant I left the chair when he knocked all the props from under my good resolutions by remarking in the most friendly manner, 'There y'are, Bill'—I was flattered at his familiarity with my name—'There y'are Bill, with a head piece fit to appear before the queen!' It's funny," Bill continued, "how a word or two sometimes will cause us to reverse our opinion. The same way in the foundry a trifling detail sometimes will result in a change of plans. For example consider that tank casting I was talking about the last time I was over here. After each course of sand is added the molder peins the sand close to the pattern, by close is meant between 1 and 2 inches. This treatment is required to prevent a soft strata on the bottom and a consequent swollen streak on the wall of the casting. So long as the sand next to the pattern is rammed to a uniform density, minor inequalities in the densities of backing sand is not a factor of any importance. The advantage of this method is that it cuts down the ramming time by approximately one-half and that represents quite an appreciable item on the larger jobs.

"Sand for the final course is rammed to a height a little above the pattern and the surplus sand is scraped off flush with a straight edge. On deep molds where it has been necessary to ram the sand hard to prevent it from straining it is advisable to vent the sand with a long vent wire in the vicinity of the pattern. These vent holes will provide a ready avenue for the escape of steam generated as the metal rises in the mold. Where this precaution is omitted some of the steam will enter the liquid iron and cause a commotion.

"The violent action will cool the iron, chew away the sand in the vicinity, create dirt and scum that probably will catch at some point before it reaches the top of the mold and form a porous area in the casting. A shallow channel is scratched in the sand from each vent hole and then the sand surface surrounding the pattern is covered with pieces of plank or a number of bottom boards on which the molder may stand or kneel while working on the remainder of the mold.

"A somewhat different procedure is followed in building the body of sand for the inside of the mold. A

A PORCUPINE? NO, NO. THAT IS OUR HERO

nice adjustment must be made in the density of sand that will resist the pressure of the iron and still allow the steam and gas to pass through it freely. Sand near the bottom must be rammed quite firmly, but outside of a light peining of each course close to the pattern, the remainder of the sand may be rammed sufficiently hard by tramping on it. Reinforcements are required in this body of sand left unsupported after the pattern is removed. Extent of reinforcement naturally will depend on the height, width and length of the sand body. A rod or a stake driven upright in each corner will support the core for a wide, shallow tank. An elaborate system of upright and horizontal rods will be required to reinforce a body of green sand 3 feet deep, 3 feet wide and 11 feet in length.

"Bodies of sand approximately this size sometimes survive with a simple reinforcement of rods laid horizontally but the risk is great, particularly where bottom runners are employed. A crack near the bottom will admit the iron and the entire core will float. Also, if one side of the mold fills before the other the pressure of metal will force the unsupported body or sand toward the low side. A little time is required to drive the upright stakes but the insurance they afford is worth the time. Wood stakes are as efficient as bars or pieces of pipe, provided they are kept back a reasonable distance from the face of the pattern.

"After the upright members are driven firmly into place about 15 inches apart, with one reasonably close to each corner, sand is rammed inside the pattern after the manner described elsewhere, hard near the bottom and gradually decreasing in density toward the top. Rods with a clearance of 1 inch at each end are laid parallel to the ends of the pattern on the first course of sand. Rods on the second course are laid parallel to the sides of the pattern. The same order is continued to a point within a few inches of the top. Method of arranging the coke bed and of venting the face of the mold has been touched upon already. Where the foundryman has a day or two of leeway he may cast a few arbors or crabs in open sand molds to serve instead of the maze of rods. One arbor with long prongs or dabbers is sufficient for each foot of depth in the core. These arbors are handled easily.

"The foregoing description covers the procedure in making plain trough or tank castings in the simplest and most economic manner. Equipment, materials and time are held to a minimum. The casting will be a trifle rough but it will serve its purpose just as well as one as clean and smooth as the petal of an Easter lily. If the customer insists on a perfectly smooth, clean surface the foundryman has a choice of several methods, but each one involves the use of special equipment and an increase in the time required to make the mold. The equipment is required for making the mold in a manner that will allow it to be taken apart, finished, blacked and dried if necessary to insure a clean, smooth surface on the casting. Naturally all this extra manipulation requires more time, and increases the cost of production."

Hougland & Hardy, Evansville, Ind., producers of molding sands, are installing equipment to blend and proportion their product to suit various specific requirements. They also are installing additional pit machinery to enlarge their capacity.

The FOUNDRY Family Photograph Album

Upper Left

R. E. KENNEDY

American Foundrymen's association, Chicago

Lower Left

L. W. OLSON

Ohio Brass Co., Mansfield, O.

Upper Right

S. D. SLEETH

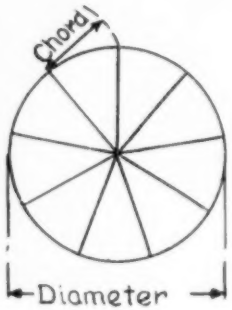
Highland Acres, Cambridge Springs, Pa.

Lower Right

G. C. MATLACK

I. P. Morris Inc. Philadelphia

CHORD LENGTHS FOR SPACING CIRCLES



By W. L. Tryon

If the diameter is in even feet or even inches, the chords can be found directly from the tables below. If the diameter is in feet and inches, add the chord corresponding to the number of even feet to the chord corresponding to the number of even inches in the diameter. For example, find the chord used for spacing the circumference of a circle 6 feet 2 inches in diameter into nine equal spaces.

	Inches
From table with diameter in feet, chord for 9 spaces, 6 feet	= 24.6254
From table with diameter in inches, chord for 9 spaces, 2 inches	= 0.6840
Therefore chord for 6 feet, 2 inches, 9 spaces	= 25.3094

The table for additional fractions is used in the same manner. For 6 spaces, the chord is equal to the radius.

No. of Spaces	Length of Chord When Diameter is 1 ft.	2 ft.	3 ft.	4 ft.	5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.
3	10.3923	20.7846	31.1769	41.5692	51.9615	62.3538	72.7461	83.1384	93.5307	103.9230
4	8.4853	16.9706	25.4558	33.9411	42.4264	50.9117	69.3970	77.8822	86.3675	84.8528
5	7.0534	14.1068	21.1603	28.2137	35.2671	42.3205	49.3740	56.4274	63.4808	70.5342
7	5.2066	10.4132	15.6198	20.8264	26.0330	31.2396	36.4462	41.6528	46.8594	52.0660
8	4.5922	9.1844	13.7766	18.3688	22.9610	27.5532	32.1454	36.7376	41.3298	45.9220
9	4.1042	8.2085	12.3127	16.4170	20.5212	24.6254	28.7297	32.8339	36.9382	41.0424

No. of Spaces	Length of Chord When Diameter is 1 in.	2 in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.
3	.8660	1.7321	2.5981	3.4641	4.3301	5.1962	6.0622	6.9282	7.7942	8.6603	9.5263
4	.7071	1.4142	2.1213	2.8284	3.5355	4.2426	4.9497	5.6569	6.3640	7.0711	7.7782
5	.5878	1.1756	1.7634	2.3511	2.9389	3.5267	4.1145	4.7023	5.2901	5.8779	6.4656
7	.4339	.8678	1.3017	1.7355	2.1694	2.6033	3.0372	3.4711	3.9050	4.3388	4.7727
8	.3827	.7654	1.1481	1.5307	1.9134	2.2961	2.6788	3.0615	3.4442	3.8268	4.2095
9	.3420	.6840	1.0261	1.3681	1.7101	2.0521	2.3941	2.7362	3.1782	3.4202	3.7622

No. of Spaces	Length of Chord to be Added for Each Additional Fraction of 1/8 in.	1/4 in.	3/8 in.	1/2 in.	5/8 in.	3/4 in.	7/8 in.
3	.1083	.2165	.3248	.4330	.5413	.6495	.7578
4	.0884	.1768	.2652	.3536	.4419	.5303	.6187
5	.0735	.1469	.2204	.2939	.3674	.4408	.5143

No. of Spaces	Length of Chord to be Added for Each Additional Fraction of 1/8 in.	1/4 in.	3/8 in.	1/2 in.	5/8 in.	3/4 in.	7/8 in.
7	.0542	.1085	.1627	.2169	.2712	.3254	.3796
8	.0478	.0957	.1435	.1913	.2392	.2870	.3348
9	.0427	.0855	.1283	.1710	.2138	.2565	.2993

(*Continued on Data Sheet No.* 716)

CHORD LENGTHS FOR SPACING CIRCLES

(*Continued from Data Sheet No.* 715)

No. of Spaces	Length of Chord When Diameter is 1 ft.	2 ft.	3 ft.	4 ft.	5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.
10	3.7082	7.4164	11.1246	14.8328	18.5410	22.2492	25.9574	29.6656	33.3738	37.0820
11	3.3808	6.7616	10.1424	13.5232	16.9040	20.2847	23.6655	27.0463	30.4271	33.8079
12	3.1058	6.2117	9.3175	12.4233	15.5291	18.6350	21.7408	24.8466	27.9525	31.0583
13	2.8718	5.7436	8.6154	11.4872	14.3589	17.2307	20.1025	22.9743	25.8461	28.7179
14	2.7602	5.3405	8.0107	10.6810	13.3512	16.0215	18.6917	21.3620	24.0322	26.7025
15	2.4949	4.9899	7.4848	9.9798	12.4747	14.9696	17.4646	19.9595	22.4545	24.9494
16	2.3411	4.6822	7.0233	9.3643	11.7054	14.0465	16.3876	18.7287	21.0698	23.4108
17	2.2050	4.4100	6.6150	8.8200	11.0250	13.2300	15.4350	17.6400	19.8449	22.0499
18	2.0838	4.1676	6.2513	8.3351	10.4189	12.5027	14.5864	16.6702	18.7540	20.8378
19	1.9751	3.9503	5.9254	7.9005	9.8757	11.8508	13.8259	15.8011	17.7762	19.7513
20	1.8772	3.7544	5.6316	7.5089	9.3861	11.2633	13.1405	15.0177	16.8949	18.7721
21	1.7885	3.5770	5.3655	7.1540	8.9425	10.7310	12.5195	14.3081	16.0966	17.8851
22	1.7078	3.4156	5.1233	6.8311	8.5389	10.2467	11.9544	13.6622	15.3700	17.0778
23	1.6340	3.2680	4.9020	6.5360	8.1700	9.8040	11.4380	13.0720	14.7060	16.3400
24	1.5663	3.1326	4.6989	6.2653	7.8316	9.3979	10.9642	12.5305	14.0968	15.6631
25	1.5040	3.0080	4.5120	6.0160	7.5200	9.0240	10.5280	12.0320	13.5360	15.0400

No. of Spaces	Length of Chord When Diameter is 1 in.	2 in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.
10	.3090	.6170	.9271	1.2361	1.5451	1.8541	2.1631	2.4721	2.7812	3.0902	3.9992
11	.2817	.5635	.8452	1.1269	1.4087	1.6904	1.9721	2.3539	2.6356	2.8173	3.0991
12	.2588	.5176	.7765	1.0353	1.2941	1.5529	1.8117	2.0706	2.3294	2.5882	2.8470
13	.2393	.4786	.7179	.9573	1.1966	1.4359	1.6752	1.9145	2.1538	2.3932	2.6325
14	.2225	.4450	.6676	.8901	1.1126	1.3351	1.5576	1.7802	2.0027	2.2252	2.4477
15	.2079	.4158	.6237	.8316	1.0396	1.2475	1.4554	1.6633	1.8712	2.0791	2.2870
16	.1951	.3902	.5853	.7804	.9755	1.1705	1.3656	1.5607	1.7558	1.9509	2.1460
17	.1837	.3675	.5512	.7350	.9187	1.1025	1.2862	1.4700	1.6537	1.8375	2.0212
18	.1736	.3473	.5209	.6946	.8682	1.0419	1.2155	1.3892	1.5628	1.7365	1.9101
19	.1646	.3292	.4938	.6584	.8230	.9876	1.1522	1.3168	1.4814	1.6459	1.8105
20	.1564	.3129	.4693	.6257	.7822	.9386	1.0950	1.2515	1.4079	1.5643	1.7208
21	.1490	.2981	.4471	.5962	.7452	.8943	1.0433	1.1923	1.3414	1.4904	1.6395
22	.1423	.2846	.4269	.5693	.7116	.8539	.9962	1.1385	1.2808	1.4231	1.5655
23	.1362	.2723	.4085	.5447	.6808	.8170	.9532	1.0893	1.2255	1.3617	1.4978
24	.1305	.2611	.3916	.5221	.6526	.7832	.9137	1.0442	1.1747	1.3053	1.4358
25	.1253	.2507	.3760	.5013	.6267	.7520	.8773	1.0027	1.1280	1.2533	1.3787

No. of Spaces	Length of Chord to be Added for Each Additional Fraction of 1/8 in.	1/4 in.	3/8 in.	1/2 in.	5/8 in.	3/4 in.	7/8 in.
10	.0386	.0773	.1159	.1545	.1931	.2318	.2704
11	.0352	.0704	.1056	.1409	.1761	.2113	.2465
12	.0323	.0657	.0981	.1294	.1618	.1941	.2265
13	.0299	.0598	.0897	.1197	.1496	.1795	.2094
14	.0278	.0556	.0834	.1113	.1391	.1669	.1947
15	.0260	.0520	.0780	.1040	.1299	.1559	.1819
16	.0244	.0488	.0732	.0975	.1219	.1463	.1707
17	.0229	.0459	.0689	.0919	.1148	.1378	.1608

No. of Spaces	Length of Chord to be Added for Each Additional Fraction of 1/8 in.	1/4 in.	3/8 in.	1/2 in.	5/8 in.	3/4 in.	7/8 in.
18	.0217	.0434	.0651	.0868	.1085	.1302	.1519
19	.0206	.0411	.0617	.0823	.1029	.1234	.1440
20	.0196	.0391	.0587	.0782	.0978	.1173	.1369
21	.0186	.0373	.0559	.0745	.0932	.1118	.1304
22	.0177	.0356	.0534	.0712	.0889	.1067	.1245
23	.0170	.0340	.0511	.0681	.0851	.1021	.1191
24	.0163	.0326	.0489	.0653	.0816	.0979	.1142
25	.0157	.0313	.0470	.0627	.0783	.0940	.1097

(*Continued on Data Sheet No.* 721)

THE FOUNDRY DATA SHEET, MAY 1, 1928

Payment will be made for all contributions on foundry and pattern shop practice suitable for publication

Expounds Principles OF SUCCESSFUL CUPOLA OPERATION-II

By John W. Bolton

USE of wet coke on the charges has much to commend it. The writer has seen some of the very hottest iron made using wet coke and, used judiciously, has found it a successful expedient. Every foundryman has noticed that iron often seems hotter on dark, wet days. Of course metal naturally looks brighter on dull days. However, careful measurement may show that the wet coke has brought about an increase in temperature. Excessive water tends to raise the bed, slow down the melting rate and reduces formation of CO, which first was proved by Gieger, *Stahl und Eisen*, vol. 29, 1919, and later checked by the author. In Germany coke has been covered with lime wash to accomplish the same purpose. The practicability of this may be questioned.

Limestone should be a fairly good grade, preferably calcareous (i.e. rich in calcium carbonate), although dolomitic limestone serves satisfactorily. Many foundrymen are afraid to use stone. In experimental work the author, THE FOUNDRY, Sept. 1, 1921, has used up to 200 pounds per ton of iron and experienced no bad effects. The proper amount to use depends on the amount of siliceous dirt charged with the iron, also on the amount of coke ash. The amount of stone should be so balanced that the resultant slag runs 35-45 per cent silica (SiO_2). Proper slag is liquid and easily handled through a 1¼ or 1½-inch taphole. Fluorspar and secret formula fluxes are not necessary as has been shown by Wilke, Klingenstein and Seiter, *Stahl und Eisen*, vol. 47, 1927.

This is the second in a series of three papers dealing with cupola maintenance and operation from a plain, practical standpoint. The third which will appear in an early issue contains among other features a bibliography of foundry literature on cast iron.

The usual method of charging the cupola is to spread the stock in even layers over even layers of coke. Good result may be obtained from this method. The author prefers to charge coke in the center where it rolls into a sort of low cone shape. Pig iron and scrap are packed tightly around the edges with steel rails on the coke in the center and stone on top of this in the center. Hot iron may be obtained in this way with a minimum of coke. No difficulties have been experienced with uneven analyses. The hottest cupola melting zone is in the form of an inverted cone.

Methods of putting in the breast vary and necessarily are somewhat different in detail according to the construction of the cupola. Certain types of breast must be put in before putting up the bottom, whereas others can be put in later, even during the charging period. Since draw front cupolas are obsolete the type of breast required need not be discussed.

The breast must resist pressure of iron from within, and in case of a temporary freeze-up, must be able to stand hammering from without. The taphole should be opened and plugged easily and surely. Under proper cupola management, practically no trouble should be experienced from the breast and taphole.

A simple breast is made up as follows: A rod is placed on the bottom brick on the same slant as the tap spout. Long pieces of coke are laid around the rod. Their ends extend into the cupola several inches and the heads are wedged for about 3 inches into the breast opening. A false breast, made of well kneaded fireclay or fireclay with a small amount of fine silica sand, is cut to the shape of the opening and a beveled opening made at, and considerably larger than, the taphole. This false breast is pressed firmly against

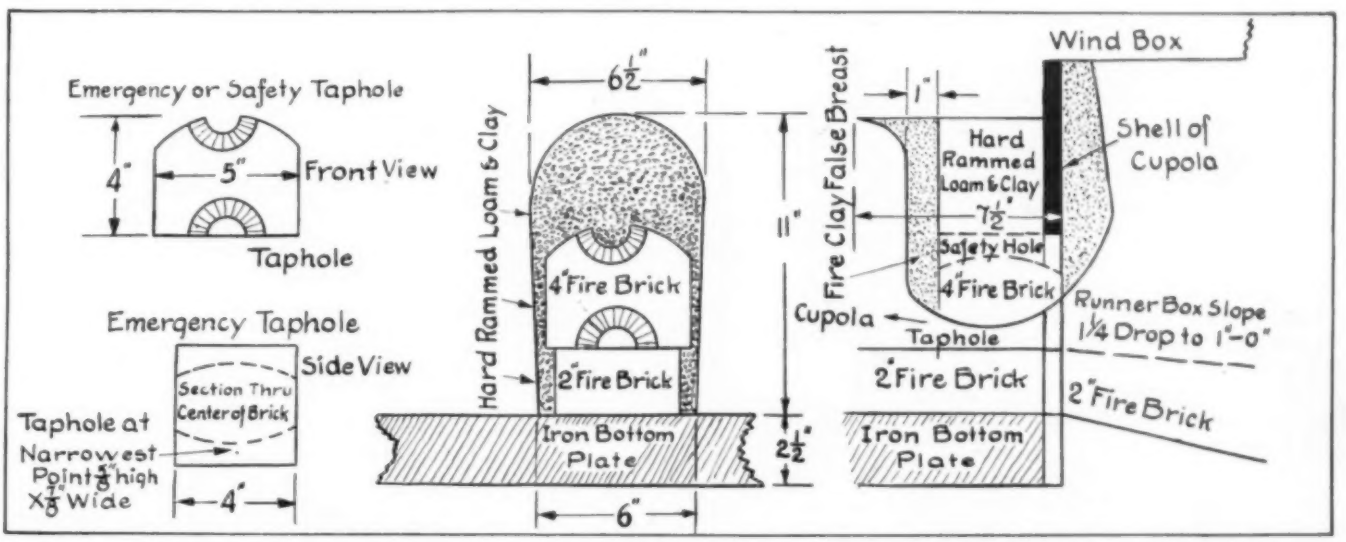
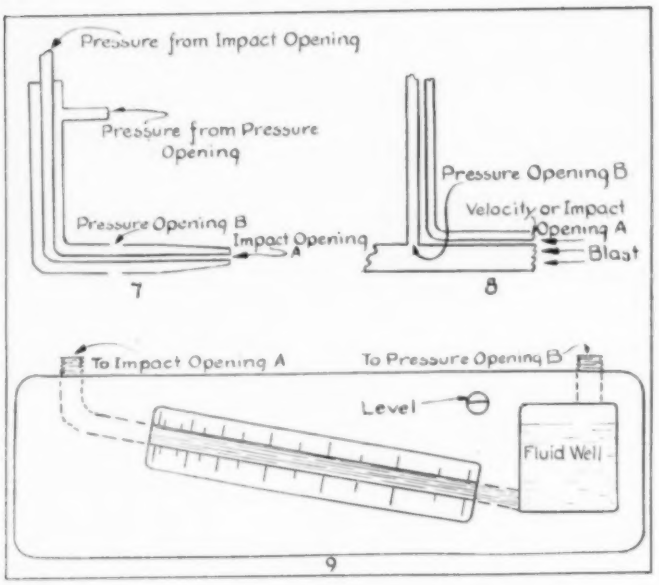


Fig. 6—Sketch Showing the Details of an Easily Made Breast Using a 4-inch Brick Containing the Tapholes



Figs. 7 and 8—Common Forms of the Pitot Tube Which Measures the Volume of Air. Fig. 9 — The Differential Scale Reads Directly in Cubic Feet a Minute

the coke and the edges around the breast opening and along the bottom brick pressed firmly in place.

Another type of breast is illustrated in Fig. 6. This breast is constructed as follows: Clean out the old breast and mud, and the runner box the distance of one brick. Then pack loam on the bottom of the runner box and place a new 2-inch firebrick flush with the brick ahead. Pack loam on the bottom plate sufficiently high and place a 2-inch firebrick on it with the top just flush with the brick placed in the runner box. Have a slight slope on this brick toward the runner box. Tightly ram loam around the sides of these bricks and cut off flush with the top.

Now place the brick, which is ground to the shape and dimensions shown in Fig. 6, in the breast hole about ½-inch behind the outside edge of the shell. This brick is dipped in slurry before setting in place. Then a form of ground fireclay with enough water to make it stiff, is made approximately the size and shape of the hole in the cupola from the 2-inch brick up. The shaped brick is held in place and the clay form is pressed firmly against it from the inside of the cupola. A heavy fillet of the same fireclay is worked around the edges of the clay form. The bottom taphole is cut out before the clay form is placed but the top or emergency taphole is found by running a sharp rod through the clay form from the front after it is in place.

Many foundries use a ready drilled taphole block. In others, a 2-inch fire brick cut in two is prepared. A small amount of plastic clay is placed under it and it is tapped into place in front of the false breast. Then it is tucked in around the edges and a mixture of one part clay to five parts heavy molding sand rammed over it to cover up the entire breast opening. The mixture is cut away from the taphole. The spout then is bricked right up to the breast and any open space packed hard with the clay-sand mixture. This keys the breast in place so that it cannot break out. A little refractory clay is worked into the bottom of the taphole to round the bottom edges. The assemblage may be blacked if desired. It is then heated thoroughly with a torch, a charcoal fire, or a wood fire. The rod is removed and the heat is drawn through the taphole into the cupola. If properly made and kept free from slag this breast and taphole will last through several moderate sized heats.

Another common type is the so-called fireclay breast put in before the doors are raised. Since this breast is more susceptible to shrinkage or contraction than the one just described, the dimensions of the breast opening should be greater on the inner or metal side. Resistance to ferrostatic pressure is attained by keying with the spout brick as in the first instance. In making up the fireclay breast, a stiff mixture—the same as described for cupola daubing, or even richer in clay—is put in along the sides of the opening. When this is filled to a slit of about 3 inches, two split firebrick are pressed firmly into place along the sides and with wedges. A small amount of the mud mixture is placed on the bottom and a bar the size of the desired taphole is pressed down into it so that the mud oozes up around its sides. The bar may be kept about ½-inch above the level of the spout bottom and should be tapered slightly downward. About 2 more inches of mud are tamped in firmly and a bar for the spare taphole adjusted in a similar manner. The remainder of the opening is filled with mud rammed hard. The bars are removed and the holes are beveled. (A long straight taphole is likely to freeze a cupola. A nice hard rod of iron chills in the taphole.)

Cupola breasts all come under the two types given. Anything can be used so long as it will hold in place and will not cut or slag away. One may find anything from brick with a hole molded in it to a mixture of molding sand and a little clay rammed into place. Logical design, resistant materials and good workmanship are the essentials. The taphole usually is around ¾-inch diameter, but may be varied according to the amount of

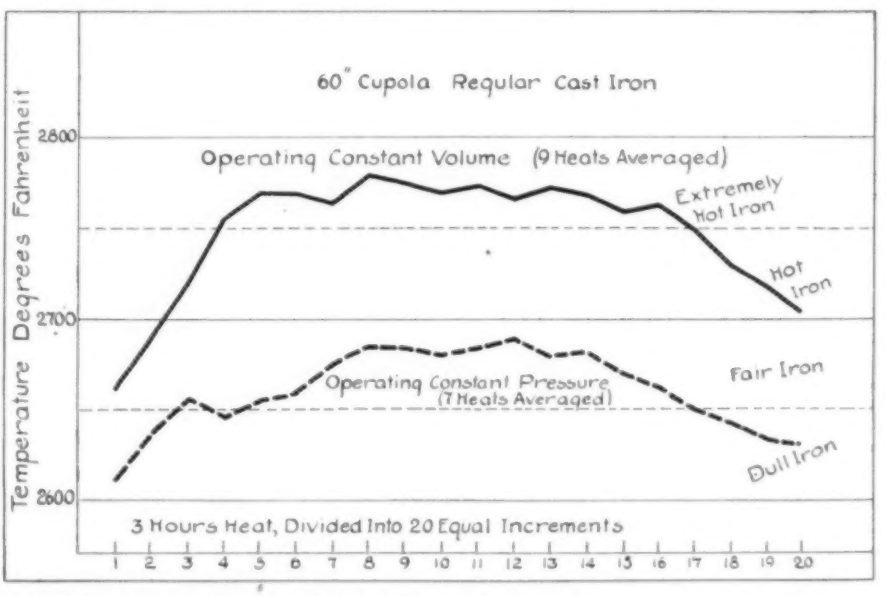

60" Cupola Regular Cast Iron
Operating Constant Volume (9 Heats Averaged)
Extremely Hot Iron
Hot Iron
Operating Constant Pressure (7 Heats Averaged)
Fair Iron
Dull Iron
Temperature Degrees Fahrenheit
2800
2700
2600
3 Hours Heat, Divided Into 20 Equal Increments
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Fig. 10—Graphic Presentation of the Relation Between Constant Pressure and Constant Volume

iron to be delivered through it in a given time.

The hole may be plugged with a loose mixture of graphite or coke breeze, with a bod on the outside before the iron comes. The bod is held in place by a heavy chunk laid in the tap spout. This dry mixture is unlikely to have iron freeze against it and is easily removed. Subsequent bods are made from a mixture with sufficient plasticity and body for safe handling, which will not bake too hard, and will chip out easily. All-clay mixtures frequently used, bake too hard. Better mixtures are made from coarse molding sand, with little clay and considerable amounts of sawdust, flour or fine coke breeze. Tapping and plugging a well made hole are simple and easy operations. Notwithstanding this sometimes they are considered part of a secret art. Poor workmanship and peculiar methods of some old melters, sometimes caused plenty of fireworks around the cupola front.

The tap spout, etc., are prepared while the stock is soaking, and everything made ready for the heat. When ready to turn on the wind all peepholes and cleanout plates are closed. The blower is started under full volume from the start.

If the preliminaries have been attended to properly there is every prospect of a good heat ahead. In 2 to 4 minutes a few drops of slag and iron may be seen through the peephole. In 5 to 7 minutes the drip of slag and iron has increased to steady streams and if one cares to keep the taphole open, iron will appear in 8 to 10 minutes. As the bottom becomes covered with molten iron a small amount of gas and steam will come through the perforations in the bottom doors. This gas usually ignites by itself. Previous experience has indicated the capacity of the well and approximately the time required to fill it. To concentrate the running of metal into a shorter space of time the first tap may be held about ten minutes longer than is possible between taps later. This seems to insure hotter iron at the start, easier tapping and a longer tap. The first or soft bod is removed and a small rod run through the taphole to clear out the loose breeze or graphite. The iron should come easily and readily. If the first ladle has been preheated properly, the first iron should run any ordinary castings. It should pour from the ladle at 2450 degrees Fahr. or better. However, the temperature should pick up some 30 to 50 degrees more during the run of the second 1000 pounds. The first iron loses heat in the bottom, well, spout and ladle.

Gradually the stock settles in the cuopla and restricts the air passages. This results in increased back pressure and may cut the volume. It is particularly noticeable with the fan type blowers. The volume gage should be inspected and if necessary the gate valve opened to get the proper volume. It is well to inspect the cupola for any air leaks at this time.

The writer prefers a practically continuous tap, but this is not always possible. With everything prepared properly, plugging the taphole is simple and easy. The bod is put in at an angle of about 30 degrees

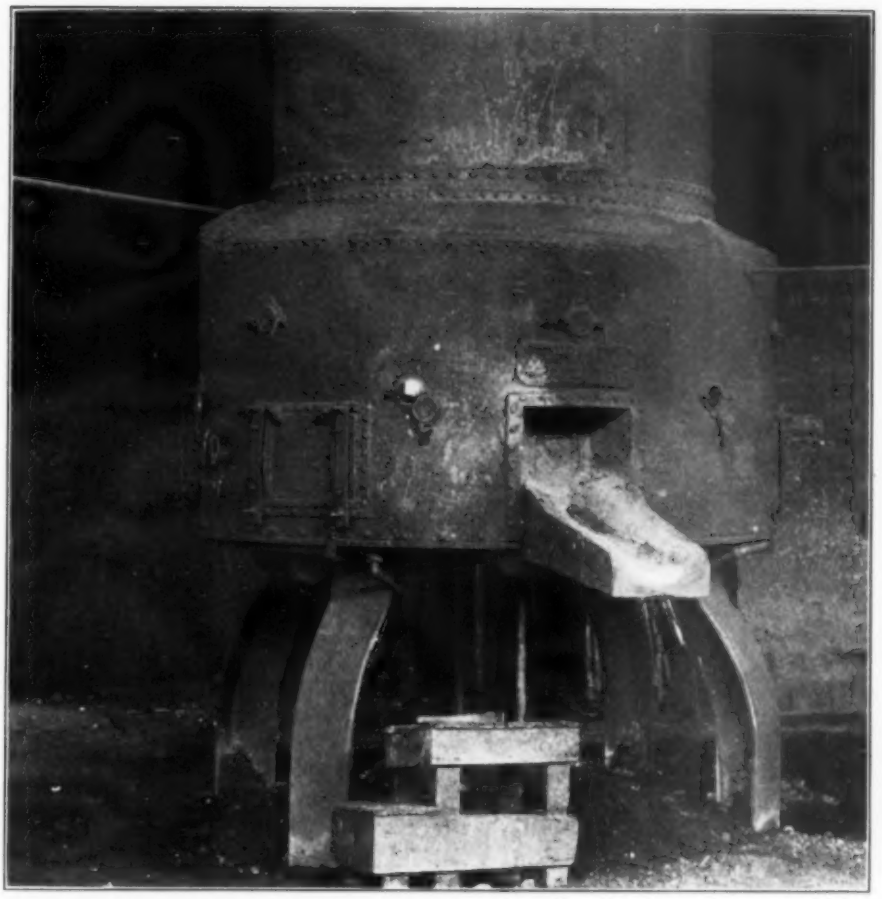


Fig. 12—After the Cupola Is Charged and the Bed Ignited, It Should Be Allowed to Soak with Little Draft for at Least an Hour Before Turning on the Wind

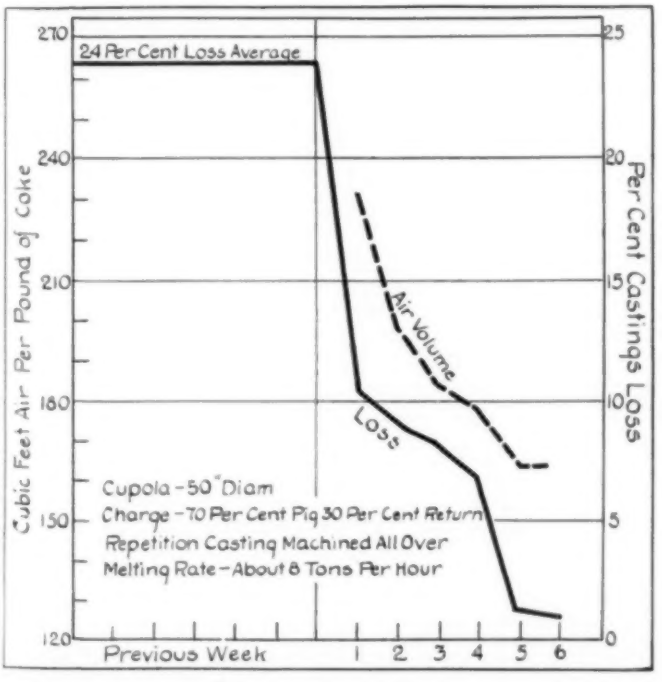


Fig. 11 — Diagram Showing the Relation of Air Volume to Castings Loss, After S. E. Dawson

Fig. 13—The Gage Mounted on the Post at the Right Allows Supervision of Volume of Air Admitted to the Cupola

above the stream. Undue haste is unnecessary and likely to cause splashing. The bod stick, about 2 feet long, is pressed firmly for a few moments to allow the bod to set in place. This necessitates the melter standing on a platform close to the taphole.

In some foundries plugging up is a regular comedy. The melter waits until a lot of slag runs out the spout then runs for the taphole like one possessed by a fiend. He slams in the bod amid a shower of iron, then turns away with a complacent air, since it must take a brave and skilled man to accomplish so dangerous and difficult a feat! A few old-timers still use a pole about 15 feet long. If the bod gets under the stream, look out! Cupola tenders occasionally are burned but this generally is due to carelessness.

Removing a hard bod sometimes is slightly difficult. The parts of the bod not in the taphole should be cut off and brushed away from the taphole. The hole then shows pink and easily is opened by a little pick or jab at the bottom. Sometimes the top part loosens too soon and there will be a brief splash as the iron hits the obstruction. In a moment this will be washed away and the stream will run smoothly.

After the cupola has been in operation from 45 minutes to an hour, a considerable volume of slag will have accumulated. This slag is removed by opening the slag hole in the rear of the cupola. The best method is to wait until the iron and slag are well up. A little experience and observation through the tuyere peephole soon will enable the tender to hit the time right. He will tap right into a hot body of slag, which will run freely. It will not be long until the iron is up, so that the tender should go to the front of the cupola ready to tap the iron. Just before the iron reaches the slag hole the slag assumes a thin watery appearance. By tapping the iron at this point danger of running iron into the slag bed is avoided. Furthermore, a small amount of slag remains in the cupola and protects the metal from excessive oxidation. Frozen slag holes usually are traceable to lack of sufficient limestone in the charges, or to improper method of opening.

When charging has ceased and the column of stock begins to drop in the cupola, the volume gage should be watched carefully. Lessened resistance allows the air to rush through more easily. Thus the volume goes up, particularly with a fan type blower. The blast gate should be partially closed, to keep the volume constant until the end of the heat. Fallacy of operating with constant pressure is shown in the accompanying illustration. Increase of blower speed, etc., at the first of the heat gives more volume and increases the pressure. At the end of the heat the static pressure gage drops, although more air is going through and there is no way to obtain any accurate regulations of the amount of air going into the cupola by use of the static gage.

Volume gages are composed of two essential parts, the pitot tube and the differential pressure gage. Two common forms of the pitot tube are shown in Figs. 7 and 8 and the differential gage in Fig. 9. The pressure on the velocity or impact opening A, Fig. 8, is composed of two pressures, the static pressure P within the pipe and the pressure due to the velocity V. Therefore the total pressure is P + V. The pressure opening B is arranged so that its pressure is only the static pressure P. Then (P+V)—P=V, the velocity pressure.

Since the differential pressure gage shown in Fig. 9 is connected both to A and B, the effective pressure is V, the velocity pressure. The gage is calibrated so that the scale reads in cubic feet of air a minute. Flexible copper tubing connects the pitot tube and the gage. While these meters or gages are manufactured commercially, the author has constructed satisfactory ones using a pitot tube, copper tubing and a home-made glass differential pressure gage at a cost of approximately $20.

Improper blast regulation and incorrect coke ratios are two reasons for dull iron at the end of the heat. Others are bunged tuyeres, poor lining, bad design and similar causes. It does not seem practical to get the hottest iron at the end of the heat. The high points show from the end of the first half hour until the stock has sunk down to about 6 feet above the tuyeres. The critical place is at the first of the heat. At the latter part of the heat the spout and ladles are thoroughly heated. However, the iron should be hot, if not highly superheated, through the last tap.

When sufficient metal has been melted the blower is shut down, the iron is drained out completely and the hole plugged before slag runs out. (This saves the breast for the next

Tabloid Advice for Operating Cupola

1. Inspection of the drop is desirable. Look at proportions of charge, splashed iron, etc.
2. Scoring at melting zone should be even and clearly defined.
3. Clean walls are the first essential in good relining. Plug holes tight.
4. A good mud is superior to brick for patching. Do not use it too wet.
5. Bottom sand should be open, strong, and on the dry side. Slope bottom toward taphole.
6. Put kindling in so that bed is ignited from the bottom over the whole area.
7. A properly made and burned bed is essential for a good heat.
8. Bed coke should be in large pieces.
9. Burn bed through *evenly*. Do not put all coke in at one time. Fill the holes.
10. *Height* of bed is important. Weight and volume charge are not as accurate.
11. Indiscriminate use of the blower to burn the bed through quickly ruins many heats.
12. Allowing the charge to soak helps for hot first iron. Allow little draft.
13. In charging, uniformity in composition and size of stock is ideal.
14. Theoretically perfect combustion conditions cannot be realized throughout the cupola.
15. Good slag can be obtained by use of limestone alone.
16. Charging all metal around edges seems advantageous, but is not common practice.
17. Good workmanship in making breast helps smooth operation and saves labor.
18. Use full volume of air from start. Use blast volume gage to measure volume.
19. True melting rate is total metal charged minus dropout.
20. Pyrometer is better than the eye for determining temperature.
21. Tapping is a simple and safe operation in a properly operated cupola.
22. A shallow taphole, front to rear, minimizes danger of freezeup.
23. Open slag hole when slag is *up*.
24. Keep volume of air constant to end of heat.
25. Cupola melting is an art as well as a science.
26. Cupola operation in each shop should be standardized.

heat.) The bottom is dropped promptly, to avoid dripping of molten iron in the cupola after the blast is off.

Enough metal should have been charged to have somewhat less than 1000 pounds unmelted iron in the drop. Dropping this metal cleans the cupola. Furthermore, if the cupola is run too low, with no metal left, the melting zone is badly scored and bridged above the tuyeres.

The drop is pulled from under the cupola and wet down thoroughly. The author also prefers to wet the inside of the cupola with a hose from the charging floor. Wetting down the melting zone makes it easy to chip, in fact it knocks off much of the loose stuff. Wetting higher up serves no useful purpose, and spalls the brick lining somewhat. The floor under the cupola and slag bed should be dry the next day!

We now have been through the complete cycle, from drop to drop. Successful operation is no mystery—simply applied common sense and good workmanship. Notwithstanding this it is probable that 75 per cent of the cupolas in this country are operated inefficiently—either in economy of fuel or in getting truly hot metal—or both. The average shop man hates to spend money for detailed research, and sniffs at scientific measurements. Yet the terms hot and cold iron are meaningless phrases as often used. The average college graduate does not realize that there is *art* as well as *science* in melting. He hates to work with his hands along with some colored boy. He feels that it is more dignified to be an executive and sit in an office. However, there are many keen shop men and plenty of college men who will work. These men get results from cupolas.

Operates Stove Foundry Continuously

(*Concluded from Page* 359)

for patterns. The pattern shop occupies a space 30 feet square in the northeast corner of the building. It is equipped with the necessary machinery and other equipment for the production of patterns in wood, plaster and metal. The designing and drafting department is located above the patternshop.

Coremakers carry on their work in an area close to the patternshop and directly across the foundry floor from the cupolas. Equipment in this department includes a revolving paddle type mixer made by the Standard Sand & Machine Co., Cleveland, and a pneumatic machine made by Wm. Demmler & Brother, Kewanee, Ill., employed for filling certain coreboxes with prepared sand under pneumatic pressure.

Sharp sand bonded with oil is employed in making the cores which are small and in some cases intricate. Metal coreboxes are employed exclusively and practically all the cores are dried in shells which prevent sagging or distortion of the cores during the drying period. A rack made up of six shelves, one above another, is stationed between the coremakers' long bench and the core oven located close to the outside of the west wall of the pattern shop. The coremaker lifts the core from the bench, on a plate or in a dryer shell, turns around and places it on one of the unoccupied shelves of the rack. A second man lifts the core from the shelf, turns through an arc of 180 degrees and places it on one of the numerous shelves in a gas-fired oven built by the company's own sheet metal fabricators. Hand ladles are dried in one of the lower sections of the oven.

With the exception of the furnace castings that are sandblasted, all the castings are cleaned in a battery of nine tumbling barrels, five rectangular, 3 x 3 x 5 feet; four cylindrical, 2½ x 5 feet, made by the Royersford Foundry & Machine Co., Royersford, Pa. The castings afterward are ground and trimmed on a battery of single and double enclosed grinding wheels made by the United States Electric Tool Co., Cincinnati.

This is the second of three articles describing the new plant of the Peninsular Stove Co., Detroit. The third will appear in an early issue.

To Feature Developments

(*Concluded from Page* 344)

core making machines, core cutting off and coning machines, core testing machines, steel core plates and steel bottom plates. The representatives will be George H. Wadsworth and M. C. Sammons.

WHITE & BROS., INC., Philadelphia—This company will exhibit brass and bronze ingot metal, copper ingot, manganese bronze ingot and babbitt metal. Representatives will be Clarence B. White, Harry A. White, Raymond Hunter, Irving G. Finn and Frank Krug.

WHITEHEAD BROTHERS CO., Providence, R. I.—This company will show a line of foundry sands and will be represented by A. J. Miller, J. H. Whitehead, V. L. Whitehead Jr., C. E. Andrews, R. L. Carpenter, H. J. Gerrard, R. J. Hashagan, T. F. Hogan, A. J. Miller Jr., B. D. Fuller, A. J. McBride, A. Y. Gregory and F. B. Clarke.

WHITING CORP., Harvey, Ill.—A new style of tumbling mill equipped with a special door clamp, combination clutch and brake motor; a cloth screen dust filter; a helical worm-geared crane ladle; a cupola; an electric crane trolley; and photographs, drawings, etc., of foundry equipment will be shown by this company. J. H. Whiting, T. S. Hammond, A. H. McDougall, M. J. Evans, R. E. Prussing, R. H. Moore, F. P. Walsh, J. R. Bates, H. E. Reynolds, S. R. Vanderbeck and M. F. Beetham will represent this company.

WILBRAHAM GREEN BLOWER CO., Pottstown, Pa.—Blowers for industrial applications will be featured by this company.

G. H. WILLIAMS CO., Erie, Pa.—This company will show a ¾-cubic yard single line bucket and a miniature working model showing a complete installation of this type bucket. W. C. Swalley and T. D. Harter will be in charge of the display.

J. E. WILLIAMS SHOE CO., Spring City, Pa.—This company will exhibit a line of safety shoes for use in the foundry. The company will be represented by James E. Williams and George S. Peterman.

T. B. WOOD'S SONS CO., Chambersburg, Pa.—This exhibit will consist of an aluminum tapered slip flask, a wood tapered slip flask and an automatic adjustable slip jacket. The flasks and jackets will be shown in various sizes. Representatives will be T. B. Wood, W. H. Fisher, Chas. M. Wood, Victor Leisher, George W. Leisher and A. H. Slothour.

E. J. WOODISON CO., Detroit—Foundry supplies and coreroom molding machinery will be featured at the booth of this company. The representatives will be E. J. Woodison, J. C. Woodison, G. A. Burman, W. J. Wark, R. S. Hoffman, L. A. Dawson, B. E. Beldin, F. Blanchette, R. Fritts and F. E. Shortsleeves.

Y

YALE & TOWNE MFG. CO., Stamford, Conn.—Electrical industrial trucks, including the new 6000-pound high lift, elevating platform truck and a new 10,000-pound capacity low-lift, elevating platform truck will be exhibited, as well as a hand and electric power chain hoist. Those in attendance will be H. J. Fuller, H. W. Grimshaw, C. H. Moeller and R. E. Wilson.

YOUNG BROTHERS CO., Detroit, Mich.—This company will exhibit a full size power conveyor oven in operation. An operating model of an overhead horizontal conveyor type core oven, laboratory oven and photographs of installations. The representatives will be C. G. Lisch, V. A. Fox, T. P. McVicker, G. I. Thatcher, G. H. Walsh and P. A. Myer.

Z

ZANESVILLE SAND CO., Zanesville, O.—This company will exhibit a line of molding sands and a group of castings which have been made in these sands. The company will be represented by Fred G. Flegal and Harry M. Flegal.

Suspend Meetings for Summer Months

The lecture course of the Chicago Foundrymen's club has attracted widespread interest among Chicago foundrymen. The club has suspended its lecture course for the spring and summer months, but will resume with a meeting the first Thursday of September. At that time the speaker will be W. H. Payne, electrical engineer, Carnegie Technical college, Pittsburgh, who will give an illustrated lecture on electric melting and annealing.

Walter Gerlinger, Inc., Milwaukee has been incorporated to handle the business formerly conducted by Walter Gerlinger. The company handles molding sands, core sands, etc.

The Shakeout

DAN M. AVEY, Editor

PAT DWYER, Engineering Editor
FRANK G. STEINEBACH, Associate Editor

CHARLES VICKERS, Nonferrous Editor
EDWIN BREMER, Associate Editor

¶ Specify the Quantity

LOW prices for steel and malleable castings have been attributed to many causes ranging from cut-throat competition to the reprehensible tactics employed by some purchasing agents to obtain low prices. However, there is one factor, determined by the operating management of a foundry, that has much to do with establishing a market by which prices for these castings are measured. This factor is the furnace operation cost or rather the cost of manufacture as based upon the number of furnaces operating. For example, when one steel furnace is operating the average cost of production might be 10 cents per pound; with two furnaces the cost might be 9 cents while with three furnaces in operation the cost would be 8 cents. With small orders the selling price of the castings would be based on the one furnace or highest rate of 10 cents per pound. Larger orders would be based on the lower proportionate production prices of 9 and 8 cents. In some instances the price might be lowered even more than on this basis alone due to the increased production due to repetition work.

THIS procedure is basically sound and meets with approved business practice. However, unless the price bid for castings definitely states the amount of work contracted, to earn the quoted price, the foundryman may receive an order which involves producing castings at a loss. This easily may be demonstrated as follows: A large consumer of steel castings is in the market for a large tonnage of castings. Most of the bids submitted are based on the assumption that the bidder will get the whole amount, but without the bidder specifically stating what quantity of castings he must have to produce them at the quoted price. This assumption may be based on previous dealings or it may be based on guesswork.

HOWEVER, if instead of any one bidder receiving the whole order, the buyer divides it among several, each of the castings makers has to produce his quota with little or no profit, simply because he neglected to specify the quantity of work necessary to obtain the quoted price. Would it not be better when bids for work are made to specify the amount of work expected or include in the bid a spread of prices with the specified amount of work demanded for each quoted price?

¶ What Price Orders

HAS the hand-to-mouth tendency gone too far? Hailed as the cure for the evil of swollen inventories and greeted by economists as the salvation of a world gone mad on forward buying, has this buying for immediate use swung too far? As is the case of most badly needed reforms, it would seem that the small lot purchasing of all commodities has thrown a heavy burden on the seller.

A CASE in point was mentioned recently by a jobber of a steel speciality. He received by phone an order for immediate delivery of an article, costing $5.70 plus delivery charges. By reason of the urgent need, he wired for quotations from several manufacturers, placed the order and secured shipment for his customer. In totaling his wire, clerical and overhead charges against this account, he found that he had expended $9.70 and his profit would reduce this loss by $1.90. In other words, his customer was served at a cost of $7.80. The total loss in the transaction probably was increased by the expense necessary in handling the order through the manufacturer's office and plant.

HOW many hurry-up castings orders result in a similar loss, particularly if the order is taken in competition with other foundries and expense of figuring and estimating the cost is included? The rush order should bear in increasing share of the burden and the small order should have a fixed charge for the individual attention that it requires. The necessary increase in price on these rush jobs will serve to reduce the overswing of the pendulum toward the hand-to-mouth side of buying practice.

Trade Trends in Tabloid

BUILDING construction, automobile production and activity in kindred and dependent lines of manufacture are furnishing an increasing volume of business to foundries. Jobbing interests in the mid-western states, particularly are favored at this time. Exceptions are noted in steel castings lines, where a decline in bookings was apparent in March and with little improvement in April. The weakness in steel castings demand is traceable largely to the lack of railway requirements. Bookings of railway specialty steel castings for March registered only 46 per cent of capacity. Car awards hold out little immediate prospect for improvement, since the March total of freight cars was only 2698, compared with 9962 for February and almost 4000 for January. Automobile production is stepping up rapidly with a total of 412,825 passenger cars and trucks for the United States in March, compared with 323,514 for the preceding month. April rate of operation has maintained this pace. Building construction figures show an increase of 6 per cent for the first quarter, although contemplated new work is not so plentiful as during the first few months of the year. Brass foundry operations continue satisfactory with prospect of improvement with the advance of summer. Malleable foundry orders are developing, supported by automotive, electrical and implement demand.

RAW MATERIAL PRICES

April 23, 1928

Iron

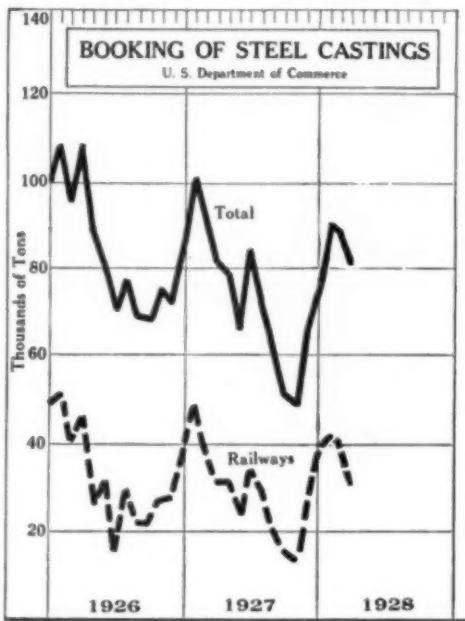
No. 2 foundry, Valley	$17.25
No. 2 southern, Birmingham	16.00
No. 2 foundry, Chicago	18.50
No. 2 foundry, Philadelphia	20.76
No. 2 foundry, Buffalo	17.00
Basic, Valley	17.00
Basic, Buffalo	17.00
Malleable, Chicago	18.50
Malleable, Buffalo	17.50

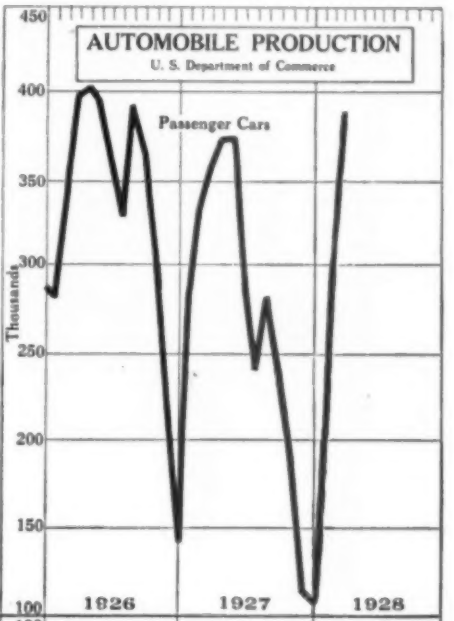
Coke

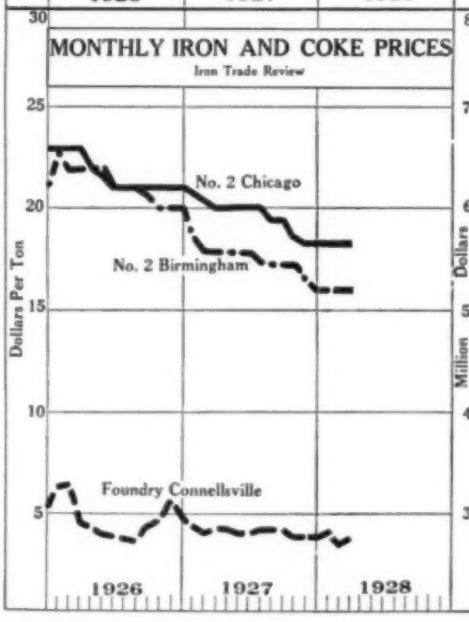
Connellsville foundry coke	$3.60 to 4.25
Wise county foundry coke	4.00 to 5.00
Heavy melting steel, Valley	$14.25 to 14.75
Heavy melting steel, Pitts	15.00 to 16.00
Heavy melting steel, Chicago	12.75 to 13.00
Stove plate, Buffalo	12.75 to 13.25
Stove plate, Chicago	11.50 to 12.00
No. 1 cast, New York	13.00 to 13.50
No. 1 cast, Chicago	14.00 to 14.50
No. 1 cast, Philadelphia	16.25 to 16.75
No. 1 cast, Pittsburgh	14.50 to 15.00
No. 1 cast, Birmingham	14.00 to 14.50
Car wheels, iron, Pittsburgh	14.50 to 15.00
Car wheels, iron, Chicago	13.50 to 14.00
Railroad malleable, Chicago	12.75 to 13.00
Agricultural Mal., Chicago	11.75 to 12.25
Malleable, Buffalo	15.00 to 15.50
Railroad malleable, Pitts	15.00 to 15.50

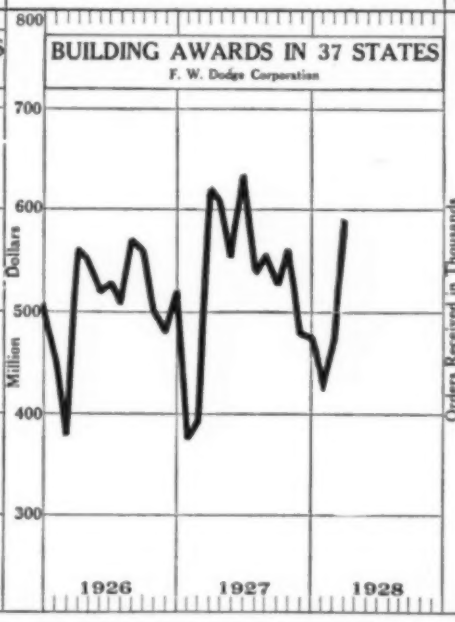
Nonferrous Metals

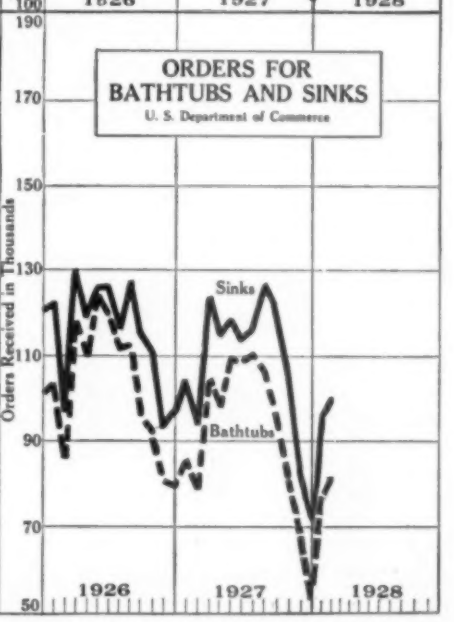
	Cents per pound
Casting copper, refinery	13.90
Electro copper, producers	14.20 to 14.25
Straits tin	51.87½
Lead, New York	6.10
Antimony, New York	10.00 to 10.12½
Nickel, electro	37.00
Aluminum, No. 12, producers	23.00
Aluminum, No. 12, remelt	16.50 to 17.00
Zinc, East St. Louis, Ill.	5.80 to 5.82½











Comings and Goings of Foundrymen

Men of the Industry, Whose Activities Are Making Foundry History

JOHN T. STONEY has resigned as the vice president of the Ferro Machine & Foundry Co., Cleveland, and will devote all of his time to the Stoney Foundry Engineering & Equipment Co., Cleveland. Mr. Stoney was born in Cleveland on Jan. 17, 1862 and received his education in the Cleveland public schools. He began serving his time in 1877 in the Robert Gray Brass Foundry and completed

JOHN T. STONEY

his apprenticeship in the Farnan Brass Works Co., Cleveland. He then went to Europe with the idea of spending a year in various foundries there, but the serious illness of his mother made it necessary for him to return to the United States a few months later. He worked for some time in the brass foundry of the Cleveland Shipbuilding Co. and the U. S. Bronze Co., both of Cleveland and then accepted a position as brass foundry superintendent of the Westinghouse Machine Co., East Pittsburgh, Pa. Two years later the brass foundry was moved to Trafford city with Mr. Stoney continuing as brass foundry superintendent. In 1906 he returned to Cleveland and became connected with the Ferro Machine & Foundry Co. as general foreman. In 1907 he was made foundry superintendent and in 1918 foundry manager. In 1922 he was appointed factory manager and elected first vice president in which position he continued until his recent resignation. Eight years ago Mr. Stoney organized the Stoney Foundry Engineering & Equipment Co., of which he now is president. Mr. Stoney's son, R. E. Stoney, who also has been connected with the Ferro Machine & Foundry Co. for a number of years, is joining his father with the Stoney Foundry Engineering & Equipment Co.

James H. Anderson has become connected with the Mt. Vernon Car Mfg. Co., Mt. Vernon, Ill. Mr. Anderson was foundry superintendent of the C. S. Bell Co., Hillsboro, Ill., for twelve years, leaving that company to become foundry superintendent of the Stover Mfg. & Engine Co., Freeport, Ill. He then was general manager of the Traction Foundry & Machine Co., until that company went out of business.

Jesse F. Monfils has resigned as sales manager and secretary of the Michigan Steel Casting Co., Detroit. Mr. Monfils has been connected with that company since 1907.

Harry Abrams has been made purchasing agent of E. R. Caldwell & Son Brass Co., Syracuse, N. Y., succeeding Ray Caldwell, who has been transferred to the New York office of the company.

Dudley V. Walker has been made general manager of the Malleable Iron Works, New Britain, Conn., succeeding Frank Miller. Mr. Walker formerly was sales agent of the Vulcan Iron Works, New Britain, Conn.

Joseph H. Jeffcott has become associated with the Vulcan Mold & Iron Co., Latrobe, Pa., in the sales and service department, succeeding Thomas W. Evans who recently resigned. Mr. Jeffcott has been identified with the iron and steel industry for the past 20 years in both operating and sales capacities. His early experience was secured in the ingot mold foundry of the Bethlehem Steel Co., and later he was in charge of the lower works open-hearth department of that company. He also has been connected with the Donner Steel Co., as open-hearth superintendent and more recently with the Jones & Laughlin Steel Corp. at the Soho plant, Pittsburgh.

J. W. Marshall recently was appointed general foreman of foundries of the Chicago, Milwaukee, St. Paul & Pacific Railroad Co., Milwaukee. Mr. Marshall served his apprenticeship at the Fort Madison Iron Works, Ft. Madison, Ia., and then worked in various foundries throughout the middle west. In 1906 he became connected with the C. M. St. P. & P. R. R. as a molder and worked in that capacity until January 1924. He then served as foreman in the wheel foundry and in April 1927 was appointed acting general foreman, serving in that ca-

J. W. MARSHALL

pacity until his appointment as general foreman.

John G. Platt, whose election as president and general manager of the Hunt-Spiller Mfg. Corp., Boston, was announced in the April 15 issue the THE FOUNDRY, was born at Zanesville, O., Feb. 11, 1874. He was educated in the public schools of Baltimore and entered the railway service at an early age as messenger for the Baltimore and Ohio railroad. In 1890 he became an apprentice in the locomotive department of that railroad and in 1894 entered the drafting room as a locomotive draftsman. He was transferred to Newark, O., in 1901 in the capacity of chief draftsman and in 1902 he was made assistant to the master mechanic of the Erie railroad, Jersey City, N. J. He was transferred to Meadville, Pa., in 1903 where he served as engineer of tests for several years. In 1907 he left the railway service to become master mechanic of the Franklin branch of the Amer-

ican Steel Foundry and later in the same year he accepted a position as mechanical representative with the Hunt-Spiller Mfg. Corp., Boston. On June 1, 1912, he was appointed sales manager and in 1917 was appointed vice president.

Dwight Ruth, has become associated with the Moulds Brass Foundry, Benton Harbor, Mich. Mr. Ruth recently resigned as assistant treasurer of the Saranac Machine Co., Benton Harbor.

Fred L. Holmes has been elected president of the Somersworth Foundry Co., Somersworth, N. H., succeeding William M. Bowman, whose death was announced in the April 15 issue of THE FOUNDRY.

Donald M. Wight recently connected with the foundry department of the General Electric Co., Schenectady, N. Y., has resigned to enter the patent law profession and will specialize in foundry and metallurgical patents. Mr. Wight graduated from Lehigh university, Bethlehem, Pa., in 1923 with a degree of mechanical engineer. He then became connected with the foundry department of the General Electric Co. where he worked in the brass, iron and steel foundries and the pattern shop.

Robert B. Schaal, chemist, Roberts & Mander Stove Co., Philadelphia, addressed the members of the Philadelphia Foundrymen's association at a meeting held in the Manufacturers' club, April 11, on the subject "Pig Iron to Castings."

Fred S. Power, general manager, St. Paul Foundry Co., St. Paul, has been elected president of the company succeeding his father, Charles M. Power, who died recently. However, Mr. Power retains his title of general manager rather than that of treasurer, as announced in the April 1 issue of THE FOUNDRY. George I. Ashton has been elected treasurer and director of the company and also retains the title of secretary.

L. E. Gilmore, metallurgical engineer, Crane Co., Chicago, spoke before the Chicago Foundrymen's club at a meeting held in the City club, Chicago, April, 5, on "Cupola and Air Furnace Practice."

M. G. Sternberg, formerly general foundry superintendent, the Hubbard Steel Foundry Co., East Chicago, has been appointed general superintendent in charge of the entire plant. The position of works manager, formerly occupied by the late Robert W. Freeland, has been discontinued. H. A. Forsberg, formerly production engineer, has been made assistant general superintendent.

John L. Blair has been made general steel foundry foreman of the W. A. Riddell Steel Castings Co., Bucyrus, O. Mr. Blair formerly was steel foundry foreman of the Industrial Works, Bay City, Mich. He also has served in that capacity with the Union Steel Casting Co., Boston, and the New England Steel Casting Co., East Longmeadow, Mass.

F. W. Shipley has been made foundry metallurgist of the Fairbanks, Morse & Co., Beloit, Wis. Mr. Shipley graduated from Purdue university, school of chemical engineering, Lafayette, Ind., in 1921 and for the next four years was chemist in the central laboratory and in the foundry of the Studebaker Corp., South Bend, Ind. During the next three years he was chief metallurgist of the Lakey Foundry & Machine Co., Muskegon, Mich.

John R. Renton for the past ten years assistant foundry foreman at the plant of the British Empire Steel Corp., Sydney, Nova Scotia, has been appointed general foundry foreman of the iron, brass and steel foundries, following the death of John J. Mc-

Supplies Photographs

Photographs of members of the Philadelphia committee arranging for the entertainment of American Foundrymen's association convention visitors, were supplied through the courtesy of Bachrach, Inc., 1715 Chestnut street, Philadelphia.

Foundry Association Directory

American Foundrymen's Association
President, S. W. UTLEY, Detroit Steel Casting Co., Detroit; secretary-treasurer, C. E. HOYT, 222 West Adams street, Chicago; technical secretary, R. E. KENNEDY, 909 W. California street, Urbana, Ill. Annual convention in Philadelphia, May 14-18.

The Buffalo Foundrymen
Buffalo
President, J. MCARTHUR, Washington Iron Works; secretary, W. J. WARK, E. J. Woodison Co., 146 Chandler street. Meetings on third Wednesday of the month at 146 Chandler street.

Chicago Foundrymen's Club
Chicago
President, DAVID G. ANDERSON, Western Electric Co.; secretary, ALBERT N. WALLIN, S. Obermayer Co., 2563 W. Eighteenth street. Meetings second Saturday in each month at the City club, 315 Plymouth court.

Connecticut Foundrymen's Association
President, FRED W. STICKLE, Capitol Foundry Co., Hartford, Conn.; secretary, C. S. NEUMANN, Union Mfg. Co., New Britain, Conn. Meetings are on second Friday of each month in various parts of the state.

Detroit Foundrymen's Association
Detroit
President, J. J. BOLAND, Griffin Wheel Co., Detroit; secretary, ROBERT HOPE, Holley Carburetor Co., Detroit. Meetings third Thursday in each month at Webster hall, Cass and Putnam avenues, Detroit.

East Bay Foundrymen's Association
Oakland, Calif.
Secretary, H. L. MARTIN, Marchant's Foundry Co., 4401 East Tenth street, Oakland, Calif.

Metropolitan Brass Founders' Association
New York
President, WILLIAM EMBER, Jefferson Brass Foundry, 62 Delevan street, Brooklyn, N. Y.; secretary, WILLIAM E. PAULSON, Thomas Paulson & Son Inc., 97 Second avenue, Brooklyn, N. Y. Meeting second Wednesday in each month at the Building Trades club, 34 West Thirty-third street, New York.

Newark Foundrymen's Association
Newark, N. J.
President, J. L. CARTER, Barlow Foundry Inc., Newark; secretary, W. H. MANTZ, Atlas Foundry Co., Irvington, N. J. Meeting called by president.

New England Foundrymen's Association
President, CHARLES F. MILLER, Universal Winding Co., Providence, R. I.; secretary, FRED F. STOCKWELL, 205 Broadway, Cambridgeport, Mass. Meetings second Wednesday of each month at the Exchange club, Boston. Outings usually are held in the summer months.

Ohio State Foundrymen's Association
President, C. C. SMITH, Toledo Steel Casting Co., Bancroft and Smoad avenue, Toledo, O.; secretary-manager, ARTHUR J. TUSCANY, 5713 Euclid avenue, Cleveland.

Philadelphia Foundrymen's Association
Philadelphia
President, WALTER WOOD, R. D. Wood & Co., Philadelphia; secretary HOWARD EVANS, Union League club, Philadelphia. Meetings the second Wednesday of each month at the Manufacturers' club.

Southern Metal Trades Association
Atlanta, Ga.
President, GEORGE B. COCKER, Gastonia, N. C.; secretary, W. E. DUNN JR., Healy building, Atlanta, Ga.

Pittsburgh Foundrymen's Association
Pittsburgh
President, C. D. CAREY, American Steel Foundries, Pittsburgh, secretary-treasurer, WILLIAM J. BRANT, Wm. J. Brant, Bessemer building, Pittsburgh. Meeting on the third Monday of the month, except in July and August, at Fort Pitt hotel.

Quad-City Foundrymen's Association
Davenport, Iowa
President, A. D. MATHESON, French & Hecht, Davenport, Iowa; secretary-treasurer, HUGO WOLF, Frank Foundries Corp., Davenport, Iowa. Meetings the third Monday of each month, the meeting place being rotated between Moline, Rock Island and Davenport.

Tri-City Technical Council
Moline, Ill.
Chairman F. V. SKELLEY, Tri-City Railway Co., Rock Island, Ill.; treasurer, MAX SKLOVSKY, Deere & Co., Moline, Ill. Combined meetings held only one or two times a year on call.

Tri-State Foundrymen's Association
Cincinnati
President, HAROLD P. RITTER, John A. Oberhelman Foundry Co., 3323 Colerain avenue; secretary, GEORGE W. PIEHL, Wessling Bros. Foundry Co., 1607 McLean avenue. Meetings the second Thursday of each month at the Cincinnati club, Eighth and Race streets.

Twin City Foundrymen's Association
Minneapolis-St. Paul
President, H. H. NOTT, Smith System Heating Co., Minneapolis; secretary-treasurer, C. E. LANGDON, 3849 Lyndale avenue, south, Minneapolis. Meetings monthly at the Athletic club.

Washington Foundrymen's Club
Seattle
President, RONALD KUCHER, Olympic Foundry Co., Argo Station, Seattle; secretary, EDWARD C. GUSTIN, The Prescott Co., 1 West Lander street, Seattle. Meetings second and fourth Tuesdays of each month at the Elks Temple, Fourth avenue and Spring street.

Donald. Mr. Renton learned the molder's trade in Summerside, Prince Edward Island, and joined the foundry staff of the steel company, then known as the Dominion Iron & Steel Co., when operations were commenced in Sydney in 1900.

Harry E. Kies, executive manager, malleable iron department, American Radiator Co., Buffalo, in addition to his duties as therein defined has been given management of the Arco steel department succeeding E. Phelps Langworthy of that plant. Mr. Kies is conducting the operation of both plants from his office at 1807 Elmwood avenue.

Obituary

Rudolph C. Koblitz, 65, treasurer of the Josam Mfg. Co., Cleveland, with a foundry at Michigan City, Ind., died in Cleveland April 7.

James L. Cox, 51, president of the Cox Foundry Machine Works, Atlanta, Ga., died recently.

A. L. Broomall, aged 44, engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., died April 10 in his home in Wilkinsburg, Pa. Mr. Broomall was born in Lenni, Delaware county, Pa., and was educated in the Westchester state normal school and Lehigh university, Bethlehem, Pa., graduating in 1906 with a degree of bachelor of science in electrical engineering. Immediately after graduation he entered the students' graduate course of the Westinghouse company and continued to work for that company until his death.

Alexander Waldron, for many years foreman in the foundry of the Waterous Engine Works, Brantford, Ont., died in that city recently after a brief illness.

Joseph Farris, owner of the Farris Furnace Co., Springfield, Ill., died recently.

John J. McDonald, for the past ten years general foundry foreman at the plant of the British Empire Steel Corp., Sydney, Nova Scotia, died March 31 in his home in that city at the age of 59. Mr. McDonald was one of the first molders employed when the company commenced operations in 1900. He was appointed assistant foreman in 1910 and was advanced to the position of general forman over the iron, brass and steel foundries nine years later.

Robert W. Freeland, age 37 years, works manager of the Hubbard Steel Foundry Co., East Chicago, Ind., died April 5 at his home in Hammond, Ind., after a week's illness of pneumonia. Mr. Freeland was graduated from the Carnegie Institute of Technology, Pittsburgh in 1913 and immediately became a special apprentice with the American Steel Foundry. Later he was appointed foundry superintendent of the Ohio Steel Foundry Co., Bucyrus, O., and in 1918 was made manager of the steel foundry of the Edgewater Steel Co., Verona, Pa. In 1920 he served as cost accountant for the Steel Founders' Society of America, Pittsburgh. Joining the Hubbard Steel Foundry Co. eight years ago,

ROBERT W. FREELAND

Mr. Freeland started as general superintendent, later becoming works manager. He was active in the affairs of the Chicago Foundrymen's club and was a member of the American Foundrymen's association. Funeral services were held April 7.

Plan Pleasure Tour

Announcement is made that the Chicago Foundrymen's club has chartered a special train on the Pennsylvania railroad for the convention of the American Foundrymen's association in Philadelphia. The special will leave Chicago at 1:10 p.m. Saturday, May 12, arriving in Philadelphia Monday morning, May 14. Side trips to Gettysburg, Pa., and Washington, will be included. Special rates are being given members of the club for this special. Those desiring to go directly to Philadelphia for arrival there on Sunday morning will be accommodated by a change of trains at York, Pa.

S. T. Johnston, nominated for president of the American Foundrymen's association, will be guest of honor on the tour.

Ohio State Foundrymen Hold Meeting

On April 18 the Ohio State Foundrymen's association held its regular meeting at the High Noon club, Cleveland. E. M. Snare, safety first division, State Industrial commission, Columbus, O., gave a short talk on safety in the foundry which was illustrated with a motion picture film depicting the various factors causing accidents. Following this, another film showing the new telephoto device for transfitting pictures by wire was presented through the courtesy of the Ohio Bell Telephone Co. Walter L. Seelbach, Forest City-Walworth Run Foundries Co., Cleveland, gave a short talk on the new Gray Iron institute. Then under the chairmanship of Ralph West, West Steel Casting Co., Cleveland, a lengthy discussion was held on the safety code as applied to foundries.

Plan Gas Course

The seventh annual industrial gas course, which is administered at the Massachusetts Institute of Technology, Cambridge, Mass., and sponsored by the New England Gas association and the American Gas association, will be held from July 18 to 28. The subject of metallurgy will be accorded major attention during this course, according to a recent announcement of J. P. Leinroth, chairman of the American Gas association committee on education of personnel. The work will be carried on under the direction of members of the Massachusetts Institute of Technology faculty and leaders in the gas industry.

Institute To Meet

The annual meeting of the Iron and Steel institute, London, will be held at the Institution of Civil Engineers, Thursday and Friday, May 3 and 4. After the presentation of the annual report and the election of new members. At the general meeting of members on Thursday, May 3, at 10 a.m. the newly elected president, Benjamin Talbot, manager, Cargo Fleet Iron Co., Ltd., will take office. The Bessemer gold medal then will be presented to Charles M. Schwab. The subject of the presidential address will be:

"The History and Latest Development of the Basic Open-Hearth process." The annual dinner will be held Thursday evening, May 3.

Among the papers to be presented are the following:

"The Influence of Nickel in Iron-Carbon-Silicon Alloys containing Phos-

phorus," by A. B. Everest and D. Hanson; "Heat-Resisting Steels, Part II—Mechanical Properties," by W. H. Hatfield; "The Properties of Nickel Steels with Special Reference to the Influence of Manganese," by J. A. Jones; "Reactivity of Coke," by J. H. Jones, J. G. King, and F. S. Sinnatt; "The Recovery and Sinking-in or Piling-up of the Material in the Brinell Test and the Effects of these Factors on the Correlation of the Brinell with Certain Other Hardness Tests," by A. L. Norbury and T. Samuel; "The Fatigue Resisting Properties of 0.17 per cent Carbon Steel at Different Temperatures and at Different Mean Tensile Stresses," by H. J. Tapsell; "On the Structure of the Iron-Chromium-Carbon System," by A. Westgren, G. Phragmen, and Tr. Negresco; "The Rapid Normalizing of Overstrained Steel," W. E. Woodward.

Removing Hazard from Piece Price Quoting

(*Concluded from Page* 353)

and the data before him will make it possible to determine to a certain degree of accuracy the status of the pattern in question. If there is any doubt whatever as to the accuracy of the weights being used on this pattern, a new estimate should be made and by difference this should be cross checked against one of the other patterns. If a discrepancy appears the list should be corrected.

Such a general correction of a pattern and its issues need not entail pattern work on the whole series until orders are forthcoming for castings from the various patterns but the general files should be flagged to show the true situation.

Describes Applications

Recently the Ingersoll-Rand Co., New York, published a comprehensive booklet containing 112 pages showing numerous applications of its compressors and compressed air tools. The booklet contains numerous illustrations showing the machines in operation. Accompanying text matter gives cost data and other pertinent facts. Copies of the booklet may be obtained by addressing the firm at 11 Broadway, New York.

Leeds, Tozzer & Co. Inc., 75 West street, New York, has been appointed representative in Manhattan, Bronx and Staten Island, New York, of the Cleveland Electric Tramrail division of the Cleveland Crane & Engineering Co., Wickliffe, O.

Heads Combustion Corp.

H. D. Savage, formerly vice president, has been elected president of the Combustion Engineering Corp., New York, a subsidiary of the International Combustion Engineering Corp., New York, succeeding Joseph V. Santry who recently resigned. Mr. Savage has been identified for a number of years with the development of pulverized fuel burning equipment. Prior to his entry into that field he was the active head of the Ashland Fire Brick Co., and served as first president of the Refractory Manufacturers' association. In 1914 he became vice president of the American Arch Co., and two years later was made vice president of the Locomotive Pulverized Fuel Co. He became connected with the Combustion Engineering Corp. in 1920.

H. D. SAVAGE

Discusses Adding Alloys To Gray Iron

Use of alloys to better the grain structure in gray iron castings, was the subject of discussion at the regular April meeting of the New England Foundrymen's association, held recently in Boston. F. K. Ziegler, Driver-Harris Co., Harrison, N. J., was the chief speaker. He told of the effect of various alloys on cast iron, such as nickel, chrome and nickel-chrome. Foundrymen were warned not to depend too much on any alloy addition. Alloys, he said, cannot correct poor foundry practice. In general, the better the castings under normal practice and analysis, the more pronounced the effect when nickel and chrome alloys are used. Mr. Ziegler advised adding the alloy to the ladle in the form of shot in the amounts as required. In this way, the regular melting practice is not disturbed and varying amounts of alloy may be used for different classes of work.

Equipment Orders Gain

The index of gross orders for foundry equipment in March was 138.6 as compared with 123.6 in February, according to a report of the Foundry Equipment Manufacturers association. The index of shipments was 147.9 in March as compared with 110.6 in February. Unfilled orders dropped slightly from 132.9 in February to 127.1 in March. The average index of gross orders for the first three months of 1928 was 131.6. The base is the average monthly shipments for the years 1922-23-24. Comparisons of monthly orders follow:

	1924	1925	1926	1927	1928
Jan.	141.8	104.2	168.2	180.4	129.7
Feb.	121.0	108.8	154.9	198.0	123.6
March	121.9	159.3	157.3	131.1	138.6
April	146.8	124.3	113.2	130.0	.....
May	108.4	113.3	128.5	134.8	.....
June	96.4	110.5	133.5	138.4	.....
July	62.8	117.0	127.3	89.9	.....
Aug.	77.5	100.0	141.2	106.4	.....
Sept.	66.0	84.2	114.0	80.4	.....
Oct.	85.5	149.5	140.5	98.0	.....
Nov.	91.4	180.3	133.4	95.8	.....
Dec.	137.8	140.1	181.0	106.8	.....

Suffers Fire Loss

The sand drying plant of the Portage Silica Sand Co., Youngstown, O., was damaged by fire April 15. Accordingly, shipments of sandblast sand will be delayed for a period of about 6 weeks from that date.

Other portions of the plant, including the washing building, were undamaged and the company is continuing prompt shipments of undried sand.

Talks on Furnaces

F. W. Manker, vice president, Surface Combustion Co., Toledo, spoke before the Syracuse chapter of the American Society for Steel Treating at the meeting held in Syracuse, N. Y., Tuesday evening, March 13. Mr. Manker talked on "The Selection of Industrial Furnaces" and discussed the factors involved in the proper selection of the various types of industrial furnaces.

Move Company Offices

The executive offices, export department and New York district sales department of the Worthington Pump & Machinery Corp. have been moved to 2 Park avenue, New York. The sales and advertising departments of the company have been moved to the Harrison plant located at 421 Worthington avenue, Harrison, N. J.

What the Foundries Are Doing

Reflecting the Activities of the Gray Iron, Malleable, Steel and Brass Shops

Buildings of the R. W. G. Foundry Co., Anderson, Ind., are being remodeled.

Dean-Hill Pump Co., Anderson, Ind., is installing new machinery. Noble Dean is the president of the company.

John Deere Harvester Works, Moline, Ill., will build a foundry at Third & Thirteenth street, to increase its capacity 20 per cent.

American Manganese Steel Co., New Castle, Pa., has awarded the contract for its new plant to John E. Healy & Son.

Star Foundry Co., 219 Main street, Covington, Ky., maker of gray iron castings, plans to build a 1-story addition, 60 x 60 feet.

Fort Pitt Malleable Iron Co., Thomson avenue, McKees Rocks, Pa., suffered slight fire damage to its cleaning department recently.

Walworth Co., Kewanee, Ill., plans to build a steel foundry sometime in the future, according to an announcement of A. J. Mather, vice president and general manager.

Phillips & Buttorff Mfg. Co., Fourteenth avenue and Hamilton street, Nashville, Tenn., is planning a $50,000 plant addition. D. W. Binns is president.

General Foundry Operating Co., Anniston, Ala., which recently took over the General Foundry Co., West Twenty-first street, has placed the plant in operation.

Pacific Car & Foundry Co., Seattle, has awarded the structural steel contract for work in its plant to the Pacific Coast Steel Co.

North Side Foundry, West Collins street, Columbus, O., has been purchased by F. P. Johness, 1019 Neil avenue, and is in operation producing gray iron castings.

Luckett Foundry & Machine Co., Corpus Christi, Tex., H. L. Luckett, manager, is inquiring for machinery and equipment for its recenlty acquired plant. (Noted April 15.)

Arcadia Pattern & Mfg. Co., 1291 Wabash avenue, Detroit, has been incorporated with $10,000 capital to manufacture and deal in wood and metal patterns.

Fellows Brass & Iron Foundry, Waterville, Me., plans to move to Medford, Mass., sometime in June. L. C. Smith is superintendent.

Machine & Tool Co. Ltd., 88 Fullerton street, London, Ont., G. Munn, manager, is inquiring for complete equipment for a machine shop and foundry, acquired recently.

Best Die Casting & Stamping Corp., 19 Thompson street, New York, plans to expand its plant and has acquired property at 33 Grand street.

Commonwealth Brass Co., 6781 Commonwealth avenue, Detroit, P. D. Dwight, president, has awarded the general contract for a 2-story plant addition to Grant Powers, 4847 Whitfield avenue. (Noted April 15.)

A new gray iron foundry will be built at West Dallas, Tex., by a company headed by Charles Sibbett. Mr. Sibbett also is secretary of the Ben Sibbett Iron Foundry Co., Wichita, Kans.

Cocker Machine & Foundry Co., 207 South Chestnut street, Gastonia, N. C., builder of cotton mill machinery, plans to build two plant additions, 1-story, 60 x 100 feet and 40 x 60 feet.

Wheeling Mold & Foundry Co., Wheeling, W. Va., has re-elected its directors, as follows: H. E. Field, C. C. Woods, Eugene Balsley, R. W. Hazlett, Henry M. Russell, D. A. Burt and H. C. Ogden.

John R. Geisinger, Camden, N. J., has been incorporated with 30,000 shares no par value stock to engage in the iron and steel foundry business, by J. S. Gradwell, Camden attorney.

Federal Iron & Foundry Co., Thirteenth and Brady streets, East St. Louis, Ill., has been incorporated with $25,000 capital to manufacture and construct ornamental, structural and architectural iron work, by H. W. Becker, Peter Morton and J. H. Gersche.

Metter's Ltd., Sydney, Australia, recently has purchased 13 acres of land at Footscray, Melbourne, on which it is proposed to erect a plant for the manufacture of stoves, sanitary ware, etc., similar to that now manufactured in the Sydney plant.

Commercial Steel Castings Co., Marion, O., has begun work on an addition to its main building, to be 60 x 120 feet, when completed. The contract for the work has been left to the Bellefontaine Bridge & Iron Co. The addition is expected to increase the capacity 20 per cent.

New Trade Publications

RECORDING INSTRUMENTS—Value of recording instruments to provide graphic proof of tests, which can be reviewed by a second person, is the theme of a bulletin by the Esterline-Angus Co., Indianapolis. Lessening the human factor and a continuous record of preformance are further advantages claimed for this form of recorder.

AIR COMPRESSORS—The sixth edition of its book indicating uses of air compressors and tools is being issued by the Ingersoll-Rand Co., New York. This publication is in two colors, 140 pages and has been translated into several foreign languages. Its title is "100 and 1 Ways To Save Money." It is illustrated largely by halftones to indicate the wide variety of uses to wheih compressed air equipment can be applied.

MOLD DRIERS—L'Outillage de Fonderie, Paris, France, recently has published a 16-page booklet describing its types of mold driers. The driers may be fixed permanently in connection with ovens or may be obtained as portable units for drying molds on the floor. Illustrations of the driers in use are shown, and data on the efficiencies are presented.

ELECTRICAL EQUIPMENT—The General Electric Co., Schenectady, N. Y., recently has issued a series of bulletins describing various types of equipment. The bulletins cover oil fuse cutouts, protective panels, a type of magnetic switch, motors, direct current generators, constant-feed direct current motors, starting compensators, and a portable type of arc welder.

INSULATION—General Insulating & Mfg. Co., Alexandria, Ind., has issued a bulletin on its high temperature insulating material. This is made from a silica rock mined near its plant. Illustrations show forms into which it is fabricated and uses to which it is put in resisting heat or conserving losses. A number of installations are shown.

CONVEYORS—Alvey Mfg. Co., St. Louis, is circulating a bulletin on its various types of conveyors for a wide variety of industrial uses. It is illustrated to indicate how it may be put to use in a wide variety of plants.

ELECTRIC FURNACE TERMINAL MOUNTINGS—First of a new series of bulletins is being distributed by the Globar Corp., Niagara Falls, N. Y. It covers terminal mountings for electric furnaces. The bulletin is illustrated by cross section diagrams and tables of specifications.

NICKEL—A bulletin by the International Nickel Co., New York, indicates what may be done to insure dependable properties in gray iron castings by the use of nickel alloy.

AIR PREHEATER—Combustion Engineering Corp., New York, has issued a catalog on its air preheater for supplying air for combustion. Diagrams show construction and operation.

GRINDERS—The Sterling Grinding Wheel Co., Tiffin, O. recently has issued the third edition of its booklet entitled "The Art and Science of Grinding." This booklet is of pocket size and contains considerable helpful and practical grinding information including numerous tables of grade, grain and sizes.

CRANES—The Whiting Corp., Harvey, Ill., has issued a booklet discussing operation and maintenance of the types of electric cranes which it manufactures. The publication contains complete information on various crane parts as well as numerous suggestions for the crane operator.

HOISTS—The Sullivan Machinery Co., 122 South Michigan avenue, Chicago, recently has issued a bulletin describing its new electric portable hoist. The publication discusses the construction of hoists and shows numerous applications.

SANDBLAST BARREL—Radial type sandblast barrels are described in the bulletin recently issued by the New Haven Sand Blast Co., New Haven, Conn. A general description of the mechanical features of that type barrel is included as well as a discussion of the principles on which the machine operates.

SAND SLINGING MACHINE—An interesting and well illustrated booklet recently has been issued by the Beardsley & Piper Co., 2541 North Keller avenue, Chicago, describing sand slinging and sand hauling equipment. The first section of the booklet calls attention to the progress which has been made in the sand slinging type of machine built by the Beardsley & Piper Co. This is followed by a detailed construction of the various parts of the machine and the various types of machines including the stationary, the portable and the locomotive types. Numerous photographs are reproduced showing the machines in operation in foundries.

HEATING UNITS—A recent bulletin of the Edwin L. Wiegand Co., Pittsburgh, lists numerous places where electric heating units may be used. Foundry uses include crane cabs, pattern shops, ovens, molds, etc.

GRINDERS—The Rotor Air Tool Co., 5905 Carnegie avenue, Cleveland, has issued a booklet describing its line of portable pneumatic grinders and drills. The publication is well illustrated with reproductions of photographs of this equipment in operation and considerable information is given on the construction and operation of the various types of tools.